RAILROAD GAZETTE

FRIDAY, DECEMBER 2.

Repairs of Masonry—The Use of Beton.

[A paper by Octave Chanute, C. E., Chief Engineer of the New York, Lake Erie & Western Railroad, read before the American Society of Civil Engineers at its Annual Convention, June 15. 1881.]

The important economical results accomplished on the Erie Railway (now the New York, Lake Erie & Western Railroad) within the last six years, by the use of béton, warrant making an exception to the general rule concerning methods which are protected by letters patent, and induce me to give an account of a material which is capable of extensive application by engineers.

Béton is simply a mortar of hydraulic cement and sand, mixed by means of patent machinery, with as little water as practicable, in proportions experimentally ascertained by M. Coignet, a French engineer. When freshly made, it looks like a loose, incoherent heap of damp sand, slightly coated with lime, and a more unpromising mortar can scarcely be imagined. When put into place, however, it forms a plastic mass, capable of being rammed into crevices of all masonry, of being molded to all shapes, and made into monoliths of all kinds and sizes, from a statue or obelisk to a culvert or viaduct.

When set, it becomes a hard and imperishable stone, with a tensile strength of some 300 pounds to the square inch, and a crushing resistance of about 8,000 pounds per square inch, or about as strong as good granite, and when well made of good materials, neither time nor the elements seem to have any more effect upon it than upon the ancient Roman mortar which it resembles in its hardness and tenacity of of adhesion to natural stones.

It is proposed to give an account in this paper of the uses to which béton has been applied on the Erie Railway:

In May, 1875, the Portage viaduct, over the Genesee River, on the Erie Railway, was burned down. This viaduct, which is 850 ft. long and 234 ft. high above the bed of the stream, had been built of wood in 1852, and rested upon 15 stone piers, from 10 to 30 ft. high. These piers were much injured externally by the fire, and when examined for the purpose of rebuilding upon them the iron viaduct which replaced the wooden one, they were found considerably shattered and shaken in consequence either of bad workmanship, the perishable nature of the stone, or the settling of the foundations.

In order to save expense, however, it was determined to use these old piers provided they could be protected from the further disintegrating effects of the weather; and investigation having pointed to the efficiency of béton for this purpose it was determined to try it.

A contract was accordingly made with Dr. Goodridge, President of the New York Stone Contracting Co.—this being the name of the organization which controls the béton process in this country—to repair these piers. This was done by encasing all portions exposed to the wash of water at the ordinary winter stage (which portions had been more or less shattered by frost and undermined by the action of water) with 24 inches of béton. The ice breakers at the ends were also encased, and the tops of the piers were covered with a coat of béton 2 in. thick, to keep out infiltration and the consequent splitting apart of the masonry. The new pedestal blocks for the posts were also boxed in with béton to keep them firm and sound.

By examining the engraving of the bridge you can distinguish the portions of the piers covered with béton by their white, blank appearance. It is on top, on the shoulders of the ice breakers, and along the base next to the water.

The amount paid to the Stone Contracting Co., for the béton work, came to about $6,000. It would have cost $40,000 to have rebuilt the piers for the new iron bridge, and thus the saving was very large. The result has been very satisfactory. The piers, to be sure, are not as good as new, but they have stood strains from the superstructure which would have shaken them all to pieces by this time if they had not been so protected.

From motives of economy less was done in 1875 than was advisable, and, as will be forther stated in this paper, after an account has been given of some other uses béton has been put to, it will be employed this year in making further repairs at Portage.

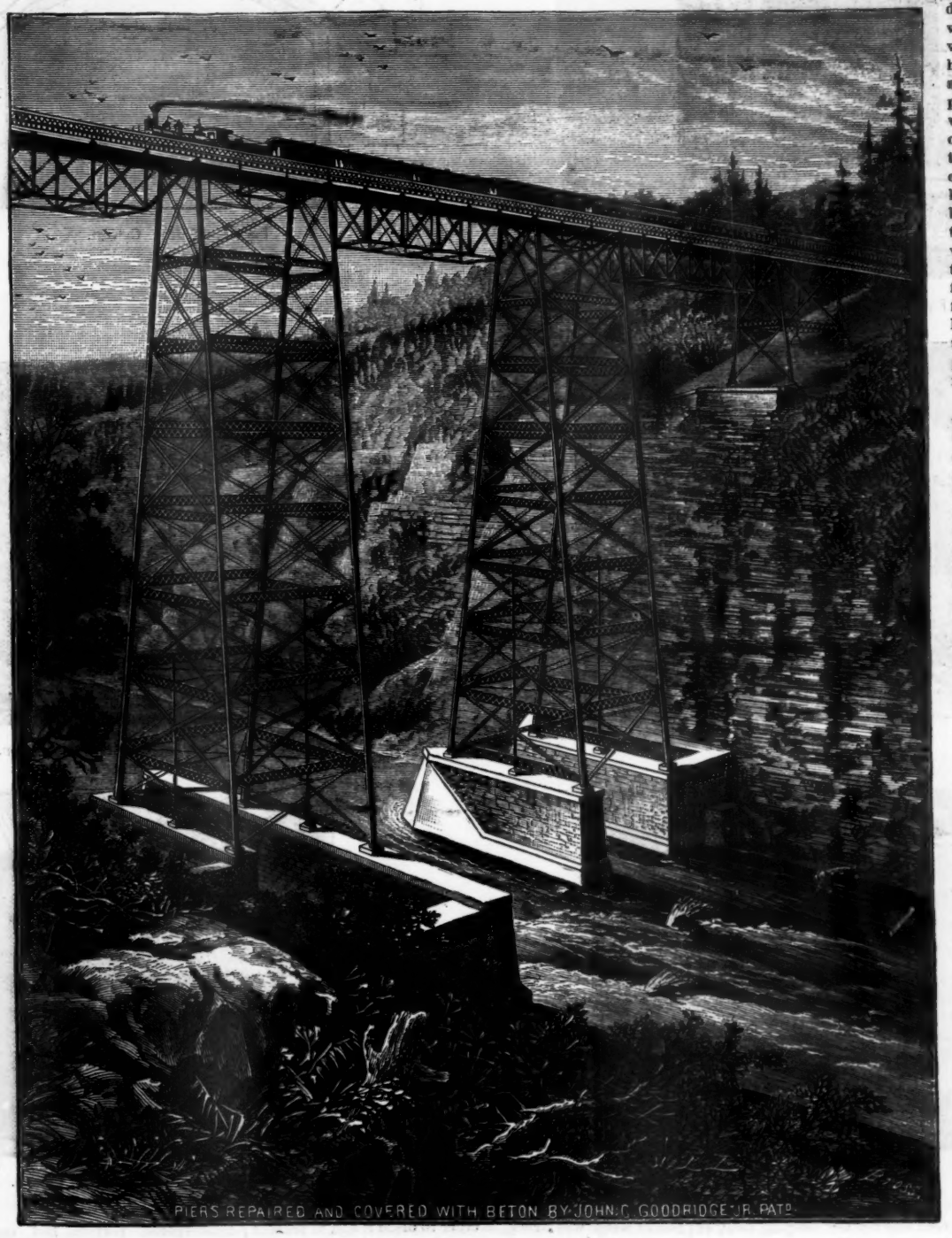


Fig. 1.—PORTAGE BRIDGE.

THE WARSAW CULVERT.

Although the Erie Railway runs much of the way through a rocky country, few of the stones found along its line stand the weather. Many of the culverts, abutments and piers have therefore been eaten into by the elements, and in the course of years, not a few have been replaced by new structures.

When such culverts are under heavy embankments, their renewal involves the great expense and risk of digging them out, carrying the track upon temporary works, and rebuilding a new culvert and embankment under the trains.

In 1875 there was such a culvert near Warsaw, on the Buffalo Division, which threatened to fall into ruins. It was 146 ft. long, 14 ft. in clear opening, and under an embankment 60 ft. in height. The frosts had gnawed its bench walls and ring stones, until they had become an irregular mass of crumbling flakes, which came down with the slightest touch. Some of the stones were entirely gone, leaving cavities from 3 to 6 ft. long, and extending back from the original face from 1 to 3 ft.

This culvert was more or less injured throughout its whole length, and hung together, apparently from the force of habit in those natural arches, which form with time in thoroughly settled embankments. It would have cost about $36,000 to have digged it out and replaced it with a new structure, as had been done during the previous year with a similar culvert upon the Western Division; when the contractor for the béton process offered to put a new face on the matter for $2,200. In view of the results already accomplished at Portage, the offer was accepted.

The work was done in this way: Wooden centres were erected inside of the culvert, and on these were placed lagging plank, section by section, leaving a space of about 4 in. between the planks and the original face of the culvert. Into this space the béton, duly mixed outside, and wheeled into the culvert, was rammed by hand until every cavity and crevice (these were previously cleaned out) were duly filled. Some of these cavities extended clear back to the earth filling, all the stone having perished. The béton lining was also extended down the bench walls to the rock foundation of the culvert. As fast as one section was filled, the centres and lagging were put up for the next, and the work proceeded as before, from the free end.

One week after the completion of the work the centres were struck; and when removed, together with the lagging, the inside of the culvert presented a hard, smooth surface (except the saw marks and joints in the lagging plank which had been faithfully molded by the béton) and the work appeared to be entirely impervious to water.

A photograph of the end of this culvert will be found reproduced in fig 2. *A* is the original arch, and *B* the béton ining, which has thus far stood perfectly.

It was completed just before cold weather, and some misgivings were felt by the railroad officers as to the effect of the succeeding winter. It was feared that water might percolate through the embankment and joints of the old work down to the béton, and there freeze and injure it. The culvert was therefore closely examined the next spring, but not a weather mark or any change whatever could be discovered.

It was thought, however, that perhaps the winter of 1875 had been too mild to test the material severely, and that another season would bring different results and show some defects or weak points in this method of saving money in the repairs of masonry. No further work of this kind was therefore done in 1876, and in the spring of 1877 a new examination was made of the Warsaw culvert to detect any possible injury. None whatever was found, but it was then, and it is now, after a winter as severe as heart could wish, as perfect as when originally built.

THE CLIFTON CULVERT.

In the spring of 1877 it was reported that a culvert at Clifton, 12 miles from Jersey City, needed to be rebuilt. It had originally been constructed of red sandstone from quarries in the vicinity, and was not only dilapidated and peeled by the weather, but it had settled upon its foundation, so that it was in a very dislocated and disjointed condition. Its wing walls had parted from its main walls, the parapet had been pushed out by the thrust of the earth, so that it partly overhung the arch, and, singular to relate, it being under a shallow bank, the vibrations of the trains acting upon the earth that pressed against the culvert, had actually lengthened it, so that its barrel was two feet longer than originally

built. We know this to be a fact, for we found the original record plan, we measured the culvert carefully, and found enough openings in the joints fully to make up the two feet it had lengthened.

It would have cost $6,000 to have rebuilt this culvert, but a contract was made to repair it for $600. This was done by lining it with an inside ring of béton, 4 in. thick, rammed into all the crevices and joints, and building béton buttresses at the ends, to prevent any further creeping away of the structure from under the trains. The success has been complete, and the culvert is now as good as new. A geometrical end view of it is given in fig. 3.

Fig. 2.—Warsaw Culvert.

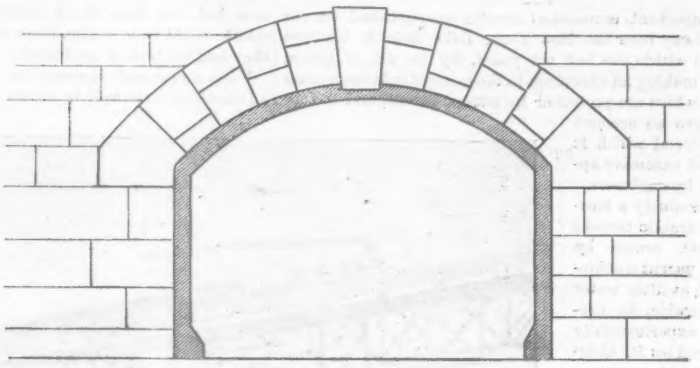


Fig. 3.—Clifton Culvert.

BERGEN TUNNEL.

In the fall of the same year it became necessary to make some repairs to the Bergen Tunnel at Jersey City. This tunnel is 4,316 ft. long, and driven through trap rock. This, although very hard and unaffected by the weather, is full of seams and faults, and being entirely unstratified, it comes down in blocks of isolated stones, which set dangerous traps for the trains. Some portions had been arched from time to time, but this had been done with brick, and in the course of years, alternate freezing and thawing had peeled off the face from the bricks, generally in flakes about one inch thick, until in some places the arching had been eaten into for a depth of 8 in.

It was decided to arch over an additional section 130 ft. long, where the naked trap rock was badly shattered, and to reline with a thin coating of béton another section 30 ft. long, in which the bricks had been most injured.

This was done by erecting iron centres, so arranged as to clear the trains, placing on the centres wooden lagging plank, and ramming the space between them and the face of the rock or brick full of béton, the latter being mixed on cars in the tunnel.

This work was all done at night, in order to have the least annoyance from trains, of which some 200 pass through every 24 hours.

Fig. 4 represents a section of that portion of the tunnel in which the béton was applied to the rock. When an infiltration of water was struck, in order to drain it and to prevent the formation of the stalactites of ice which hang down (and fall down) every winter from the rock, drain tubes were left in the béton by inserting hollow blocks made at the factory.

The work was successfully accomplished, and has stood perfectly ever since

Fig. 4.—Bergen Tunnel.

Fig 5.—Culvert 101, Broken.

Fig. 6.—Culvert 101, Repaired.

Fig. 7.—Culvert 4, Broken.

BUFFALO DIVISION CULVERTS.

No. of culvert.	Length in feet.	Span in feet.	Crown of arch to foundation. Feet.	Height of embankment, base of rail to bed of stream. Feet.
80	147	10	17	87
3	141	10	12½	62
113	118	6	7	72
100	100½	6	9	30
4	113	10	13	63
77	52	6	10	28
101	46½	5	8	24
104	52	5	8	24
105	40	5	8	24
49	65	6	9	33
51	87	5	8	32
54	71	6	9	34
73	117	6	8	48

Thoroughly convinced by these successes, a further contract was made in 1878 to repair, by the same means, a number of culverts on the Buffalo Division, which were getting into the same condition as the one at Warsaw, which I have described. A list of them is given above.

These 13 culverts, which had been built in 1851-52, had been nursed for some years, and exhibited all the ills to which masonry is subject in its old age. The stones were disintregated, portions had caved in, the foundations were undermined, the bench walls were broken-backed, the arches were distorted, and the ends and parapet walls were thrust out. These were repaired with appropriate doses of béton.

Figs. 5 and 6 show the end of culvert No. 101, and Figs. 7 and 8 the end of culvert No. 4, before and after taking Dr. Goodridge's "Béton Specific."

I regret that I cannot show you also photographs of the interior of these culverts, to exhibit their other defects. These were much worse than those shown.

Fig. 9 shows how béton buttresses were applied to culvert No. 80, which is built on a slant on a sloping bed of shale, which disintegrates with the weather. An invert, partly shown in the cut, was put in to prevent further injury.

Fig. 10 shows a similar invert in culvert No. 113. The middle of this had caved in and the arch was distorted. This culvert was 118 ft. long.

Fig. 11 shows the new form given to culvert No. 105, in which the ends were down and the interior much injured.

In all cases in repairing these culverts all the loose mortar was picked out of the joints, the loose flakes of stone were

knocked off, and the béton was rammed into all the holes and interstices.

We estimate that it would have cost to dig out and trestle these culverts, some of them being, as will be seen by the table, under embankments from 60 to 80 ft. deep, and to have rebuilt them with new masonry, at say $10 a yard, the sum of about $80,000. We paid the contractor for repairing them $15,112.45, and we estimate that the labor of our carpenters, making and erecting centres, the free transportation of men and materials over the road, etc., etc., may have

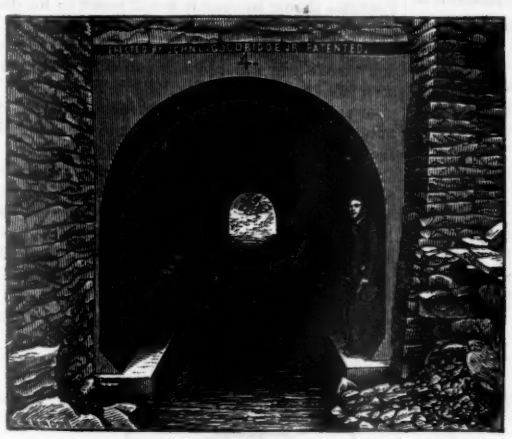


Fig. 8.—Culvert 4, Repaired.

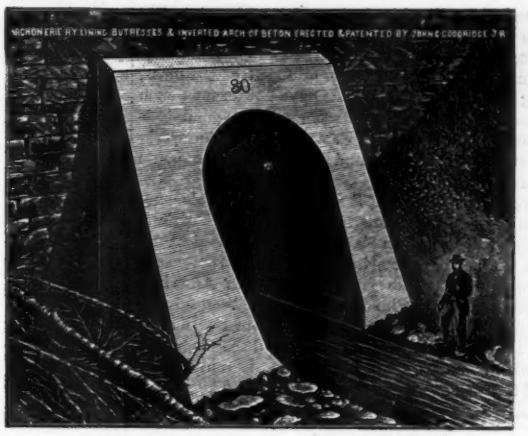


Fig. 9.—Culvert 80, Repaired.

Fig. 10.—Culvert 112, Repaired.

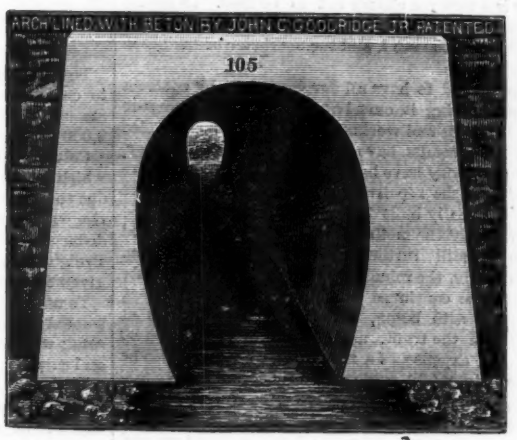


Fig. 11.—Culvert 105, Repaired.

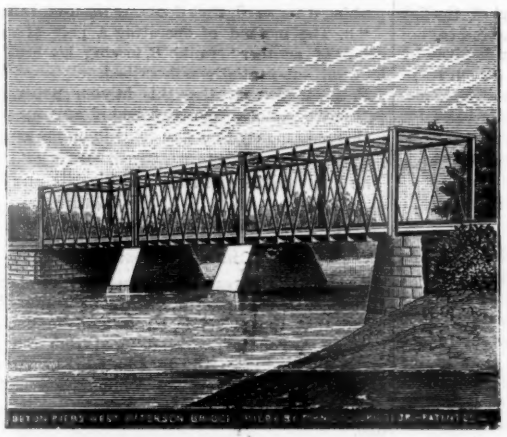


Fig. 12.—West Paterson Bridge.

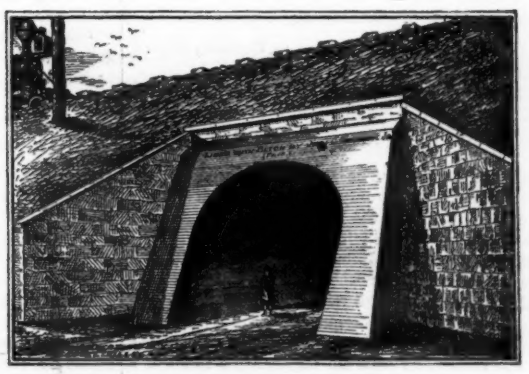


Fig. 13.—Blauveltville Arch.

amounted to $5,000 more, so that the aggregate cost to the railroad was about $20,000.

The economy of the process was, therefore, marked and monotonous. All the culverts have stood perfectly ever since.

WEST PATERSON BRIDGE.

In the Spring of 1880 the two piers under the double-track iron bridge over the Passaic River, at West Paterson, were reported as cracking open and falling asunder. They were founded upon cribs, resting on the sandy bottom of the river, and the settling of the cribs, together with the jarring of the trains, was shaking the piers to pieces. It would have cost $12,000, and have involved some risk, to have rebuilt them under the bridge. After careful consideration and discussion it was decided to envelop them entirely in a shell of béton from 4 to 12 in. thick. For this purpose wooden frames, planked inside, were erected at a suitable distance off, all around the pier, and the space between the planks and the stones was rammed full of béton. A coat 4 in. thick was also put on top, the whole inclosing six iron rods, three on a side, which had been temporarily put around the pier, to keep it from tumbling apart while its temporary repair was under discussion.

The cost has been $6,000, and it is confidently believed that the piers are now good for many years; for the béton being an average of 12 in. thick on the sides, and 4 in. on top, and of a tensile strength of say 300 pounds per square inch, it would require an internal stress in the pier of

				Pounds.
One side	12 ft.	× 12 in. × 12 in.	× 300 =	518,400
Other side	12 ft.	× 12 in. × 12 in.	× 300 =	518,400
Top	5 ft.	× 12 in. × 4 in.	× 300 =	72,000
Total				1,108,800

to burst its shell asunder, while the 6 iron bolts, 1⅛ in. in diameter, are only good for 300,000 pounds.

These piers are shown in fig. 12.

DAM AT PORTAGE.

In the fall of the same year it became necessary to make further repairs at Portage. The stones in one of the piers which had been injured by the fire were found to be flaking off dangerously near to one of the pedestal blocks, which carry the posts. This was easily repaired and further disintegration prevented by a buttress of béton over the injured spot.

Another pier was found more seriously affected. It had been built on top of a loose mass of rubble stone about 20 ft. thick, thrown out when the Genesee Canal was excavated, and, although strong enough to carry the wooden trestle, with its many posts, proved insufficient to carry the concentrated weight on the two iron posts which constitute the iron piers. Their weight had broken the back of the stone pier and forced down the outer ends some two inches into the rubble beneath. There was no telling where the injury would stop, and repairs were urgent. As it was late in the season when this was discovered, temporary repairs only were attempted. These were made by throwing out béton buttresses, beyond the ends of the pier, thoroughly bonded with it, and thus increasing the bearing area upon the loose rubble to about double the amount it had before. This has stopped further settling for the present, but to be entirely safe, we deem it necessary to extend the foundations under the iron posts either down into or entirely through the loose rubble, which is on a sloping bank of rock.

This we propose to do by drifting in narrow galleries through the loose rubble under the pier, and filling them with béton, which, when thoroughly set into stone, we propose to use the sides and roof of the other galleries, to be likewise drifted in and filled with béton, until we have a solid mass under the pier to a suitable depth.

I will tell you next year how we have succeeded.

We also propose to administer béton to the Genesee River This has worn its way to a depth, varying from 200 to 600 ft., through the Portage group of clay shales, which have a bad notoriety for their disintegration under the action of the weather.

When the Portage bridge was first built, a waterfall 60 ft. high had its crest 240 ft. down stream from the bridge. It wore back, first in the shape of a horseshoe, and then all on one side, so that now the nearest point in the top of the cascade is only 119 ft. from one of the piers, and it is wearing back at the rate of about 15 ft. a year. The chief trouble arises from the shaly, rocky bed of the river, which cleaves into blocks, shells off and is swept down the waterfall by the floods. Operations were begun last fall by running a béton dam 210 ft. long and 8 ft. high, which deflects all the water, at ordinary stages, from the portion where the rock has been wearing away fastest, but is submerged in floods; and will be followed up this year by filling in with rubble masonry a cavity in the rock, where the water is boring a dangerous channel nearest to the pier, and putting an apron or floor of béton over the whole bed of the stream where there is fear of its wearing back

BLAUVELTVILLE CULVERT.

The preliminary work at Portage last fall occupied so long that winter was upon us before we could repair a culvert of 16 ft. span at Blauveltville on the Piermont Branch, which carries a wagon-road under our track. However, in

December the travel was turned over to an adjoining road, both ends of the culvert were boarded up, a couple of stoves were put in it, the pipes run out through the ends, and the béton men, provisioned with the necessary sand and cement as food for their machine, went into winter quarters. They emerged this spring, leaving a new culvert lining behind them. The end is shown on fig. 13.

COST OF THE WORK.

In doing this work, different prices have been paid, according to the difficulties of the various locations; varying from 60 cents to $1 per cubic foot, or from $16.20 to $27 per cubic yard. No new structures have been built entirely of béton, because, although they could be made considerably lighter in consequence of the greater strength of the mass, thus forming one single monolith, we have not deemed such structures more economical than masonry, where good stone can be procured at about $10 a cubic yard in the work. Where, however, stone is scarce and sand plenty, the béton would be the cheapest.

The cost would be reduced, if it were found possible successfully to use some of our American cements. A Portland cement, made at Boulogne, in France, has been used exclusively on the works above described, and the contractor says that his attempts to make good béton with American cements have resulted in failures. There have been failures also in France; some of the sewers of Paris, lined with some cheap stuff, are said to have peeled off, and the viaduct of La Vanne, which was wholly built of béton, is said to have cracked and flaked off to a dangerous extent. The proportions used for this structure I understand to have been

20 parts of sand,
4 " lime,
1 " cement.

So that this is a formula clearly not to be used. In fact, I can give you no formula, as the proportions are said to vary with the fineness of the sand, and the character of the béton which is required.

We have preferred to have all our work done by contract instead of attempting it ourselves, in order to make sure that the proportions and workmanship should be controlled by experts. The results have been entirely satisfactory. Large sums of money have been saved, not a single failure has occurred, and the repaired works seem likely to endure as long as if originally built of sound stones.

It is believed that the methods which have been described are capable of still further adaptation and extension. Existing structures, the rebuilding of which would seriously interfere with the continued use of a road, canal or edifice, can be repaired with béton, as has been shown, without interference with the traffic, and at a cost of from 10 to 20 per cent. of the expense of a new work. This can also be done very rapidly, 6,000 cubic feet of béton, or over 200 cubic yards, having, in some instances, been put in in a single day, so that engineers who may adopt this method of repairing masonry may be certain of saving both time and money.

Contributions.

Adjustment of Grades to Curves.

RENO, Nevada, October, 1881.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The question of the adjustment of grades to curves is one which has not yet received anything like the consideration which it deserves from all engineers who are laying out the lines of our railroads.

Mr. Wellington's book, "The Economic Theory of the Location of Railways," is the only one of the kind I have ever heard of which treats of the subject in such a manner as to be of any real use to an engineer.

For the production of this admirable book, Mr. Wellington deserves the gratitude of the engineers of the United States, and something more substantial than gratitude from railroad companies who are building new roads.

But this book, good as it is, is only an introduction to the subject; and as there have been no experiments made of a sufficiently extended character to fully determine how much reduction of grade is required to exactly compensate curve resistance, it is necessary to experiment and learn as fast as we can from experience.

A short account of what has been done on the Nevada & Oregon Railroad in this way may be of interest to others, and help them to start a little farther ahead in the subject than I was able to do. I will say in explanation that our road is of 3 ft. gauge. The limit of grades was fixed at 100 ft. per mile, and of curves at 18°. As we had to grade 10 miles before we had any iron to lay down, we had to build that much on faith, and test our theories afterward.

On page 184 of his book, Mr. Wellington shows that the slight reduction for curves heretofore made by some roads was not enough to compensate the *limiting* resistance of curvature; so, as there was no precedent for *any* particular amount, we tried his suggestion of reducing 0.1′ per degree for each 100 ft.

After grading five miles we became convinced that the resistance did not increase directly as the curvature, but that it was much less than the average on light curves, and much more on sharp ones. We then adopted a sliding scale, in which the reduction was only 0.02 ft. for a 1° curve, and increased in amount as the curve became sharper; so that for an 8° curve it amounted to 0.06 ft. per degree; and 18° curves were made level.

When the track was finally laid, and trains running, we found that our first reduction was a little too much, as the train would gain speed on all curves, without any more steam.

On the second five miles the reduction on curves of less than 8° appears to be about right, as there is no perceptible change of speed when running off a tangent on to a curve, or *vice versa*. But on curves sharper than 8° it is too much, as on the first five miles.

Since then I have worked out the following table. It is derived in part from a formula given as the result of experiments made by the Belgian government to determine the amount of curve resistance.

The formula is $R = \frac{0.6504}{Radius - 55}$, in which the radius is in metres; and R is the coefficient of the curve resistance.

Table of Curve Resistance and Equivalent Grades on Straight Lines.

CURVE.	Coefficient of resistance....	Resistance in pounds per ton.....	Equivalent grade in feet per mile.....	Equivalent grade in feet per 100 ft....
Tan.	0.00000	0.00	0.00	0.00
1°	0.00038	0.76	2.60	0.03
2°	0.00081	1.62	4.26	0.08
3°	0.00124	2.48	6.53	0.12
4°	0.00172	3.44	9.05	0.17
5°	0.00222	4.44	11.68	0.22
6°	0.00277	5.54	14.58	0.28
7°	0.00336	6.72	17.68	0.33
8°	0.00401	8.02	21.11	0.40
9°	0.00471	9.42	24.79	0.47
10°	0.00547	10.94	28.79	0.54
11°	0.00631	12.62	33.21	0.63
12°	0.00723	14.46	38.05	0.72
13°	0.00826	16.52	43.48	0.82
14°	0.00938	18.76	49.37	0.93
15°	0.01066	21.32	56.10	1.00
16°	0.01204	24.08	63.30	1.19
17°	0.01369	27.38	72.05	1.36
18°	0.01555	31.00	81.60	1.54
19°	0.01767	35.34	93.00	1.76
20°	0.02019	40.38	106.26	2.01

The second column gives the coefficient of resistance due to curvature for each degree of curve up to 20°. The amount of resistance per ton was obtained by multiplying 2,000 by this coefficient for each degree.

Column 4 shows the grade per mile on a straight line, which would give a resistance due to gravity equal to that due to curvature. To obtain it, the resistance per foot of rise was taken as 0.38 lbs. From this one, column 5 was deduced. It shows the amount of rise per station on a straight line, which would produce the same resistance as the given curve would produce on a level.

To use the table, the amounts in column 5 must be subtracted from the maximum grade on a tangent, and the result will give the amount of grade permissible on the several curves.

With any given maximum rate of grade on tangents, the table will show the maximum degree of curvature which ought to be used with it; for, of course no curve should be used in which the resistance due to curvature alone exceeds that due to gravity on a tangent.

As we have not yet laid any rails on that part of the line which was laid out in accordance with this table I cannot tell how nearly correct it is; but the rates of grade given by it are almost exactly the same as those we used for curves of less than 8° on the second section; so I think it is a close approximation to the proper amount, and a safe basis for further experiments. H. G. MCCLELLAN,
Chief Engineer Nevada & Oregon Railroad.

A New Application of the Fontaine Principle.

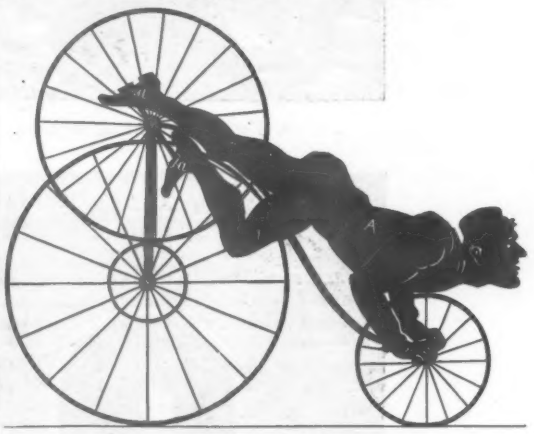
TO THE EDITOR OF THE RAILROAD GAZETTE:

There are a great many mechanics and inventors in the country who have taken much interest in the discussion over the Fontaine engine, and I must say that the way the *Railroad Gazette* has treated the question is most unfair. It is generally known and admitted that most inventors are practical men, who have learned what they know in the shop, and so to speak by the sweat of their brows.

As every practical mechanic will tell you, what a man learns in that way is worth much more to him than the science, with its x + ys, that the college-learned fellows are always talking about. It is not giving a workingman either a fair show when he invents anything to take any of these new-fangled sciences, like the conversation of energy, and use them to upset what he has got up with his own ingenuity. I tell *you* there is quite too much of this monopoly business going on, and that the scientific fellows need not think that gravitation, leverage and moments can be used to crush the honest inventor. I tell *you* it is not only in money matters that there are monopolists. There are Vanderbilts and Jay Goulds who think they can make a corner on us practical men by getting all the knowledge of science in their own heads, and then when a working-man takes out a patent they crush him by showing that his machine don't agree with the laws they have laid down. I tell *you* that if the law of gravitation and the conversation of energy is going to be used to defraud honest inventors, they have got to be changed. There is quite too many such aristocratic notions around—some of which your editor probably got when he was in Europe—especially among colleges and scientific schools. Fortunately, we have a paper that stands up for our rights, and when the *Railroad Gazette* pokes its theories at an invention, like this new locomotive, the other paper comes out bold, and says it is "not concerned with theories," but it wants "practical performance." It is true that report says that the performance of the Fontaine engine on the Pennsylvania road was not a first-rate show, but then everybody knows that the officers of that company have quite too much aristocracy about them to give a practical inventor a chance, and as soon as the engine got there they attacked it with thermodynamics. It is said that they put some of that stuff in the boiler so as to keep it from making steam.

The Detroit *Post and Tribune* is another paper that stands up for practical inventors, and it showed exactly what the true insideness of your attack on the Fontaine engine was. It said that one of your editors "is rumored to own several of the patents on 'Longlegged No. 10,' on the Pennsylvania Railroad, which are a source of gain to him, and if the Fontaine should succeed it would result to his damage." It has been found out since that he does not own a patent on the No. 10 or any other engine on that road, but then that don't make any difference, because he would have owned such patents if he could. There must be some reason for your attack on the Fontaine engine, any way; to write and publish an article because it seems to be true and fair shows that you are not practical.

Any way, I'm going to show you that your mule and your theories can't upset the new principle of reinforcing power. You must admit that if the principle is good in locomotives, it will work just as well for a velocipede. I have seen this and invented and patented a new vehicle of that kind, of which I send you a sketch with this letter and a copy of what I claim. I am also thinking of applying the principle to your mule, and taking out a patent for the combination.



Velocipede on the Fontaine Principle.

"*Claims:* I claim as my invention, and desire to secure by letters patent, the following features:

"1. A velocipede with super-imposed friction wheels arranged posteriorly to a man axially inclined.

"2. The 'reinforcement of the power' of the operator, effected by means of the duplex action of his legs and arms; the backward thrust of the former propelling the vehicle by the rotation of the cranks, while his arms are simultaneously pushing it forward, thus doubling the useful effect.

"3. The method of operating a pair of cranks *aa*, by means of another 'crank' *B*, having his heels higher than his head, substantially as described. X. Y. Z."

P. S.—If you mention this in your paper, say that I'm getting up a stock company, and if any one will furnish a little ready money they can come in on the ground floor.

The Early History of Railroad Signals and Telegraphs.

[Translated for the *Railroad Gazette* from "Railroad Signals and Telegraphs," by Baron M. M. von Weber.]

[*Continued from page 647.*]

As early as the year 1835, when the construction of the Leipzig & Dresden road was scarcely begun, it was anticipated that the principle on which the line was located through the country, which differed from the English lines materially and especially by admitting level road crossings, would make necessary safe communications from one station to another and the warning of the watchmen along the line.

It was strange that in this direction, with the endeavors made to effect this result, attention was not first given to well-known means offered by optical or acoustic systems of signaling, but in the management of this road, the results of experiments by Gauss and Weber, then attracting much attention, were discussed.

In this wise it came to pass, that already at that early period, the electric telegraph came near finding its first application to railroad purposes in Germany.

The pleasure this occasioned is expressed in a highly interesting letter of Wilhelm Weber, dated July 12, 1835, and addressed to Linnaeus Erdmann (member of the directory of the Leipzig & Dresden Railroad*), in answer to an inquiry by him.

Weber proposes in this letter, on completion of a portion of this road, to begin the construction of the electric telegraph, but somewhat strangely proposes, supported by Gauss' discovery that the earth is "several million times" a poorer conductor than iron, to employ the rails, without any insulation, to conduct the current, and he even describes the method by which he would connect the ends of the rails for this purpose. As as that time the Steinheil law concerning the return earth current was unknown, he proposed using one rail to conduct the current in one direction and the other to return it.

He considered the Gauss reflector apparatus as best adapted for making the signals, and urges the immediate construction of one.

* Records of the Leipzig & Dresden Railroad Company. Vol. I, fol. 2.

How far actual results lead us away from speculations, even the most erudite theories, is shown by a passage in this letter, where the learned philosopher expects the chief effect that the adoption of the electric telegraph would have for security on the railroad in the fact that "any break in rails would be at once automatically announced by it."

An article by Gauss* dated Sept. 15 of the same year goes still deeper into the question. Therein he recommends a copper wire, of 1.6 millimetres, or an iron wire of 3.8 millimetres diameter as a conductor, using the rails for the return current. The employment of the latter alone for communication in both directions he considers impracticable only because the wheels and axles of the rolling stock would establish a connection between the two lines of rails. The capability of his reflector apparatus to transmit eight letters per minute appears to him sufficient.

In the lofty language of the proud scientist, who swears by his ingeniously arranged experiment, Professor Weber puts aside all doubts as to the practicability of their scheme in a communication to the administration of the Leipzig & Dresden Railroad, dated in March, 1836.†

"Gauss," he says, "has perfected the theory of the electric telegraph. The distance it will work, size of the wire, the strength of the current, etc., may all be calculated with the same unerring certainty as an eclipse of the moon." The application of the telegraph to the railroad would therefore be "no experiment, but an undertaking that could be vouched for." It was just as certain "that copper wires of ¾ in. in diameter, laid through the ocean to India or America, would establish telegraphic communication with those countries." These were the teachings of science in those days.

As apparatus, Weber again wished to employ an appliance constructed by Gauss, in which, however, a needle was to be deflected to different letters.

The entire cost of the apparatus between Leipzig and Dresden, "as no conductor except the rails would be necessary," was estimated at five hundred thalers [$365]. This warmth of conviction on the part of a distinguished, clear-thinking man of the irrefutable truth of something that was afterwards found to be absolutely erroneous, reminds us, but in the reverse sense, of the belief in the slipping of the locomotive wheels on the rails, which so long retarded the development of this steam engine, and which belongs among the melancholy occurrences in the province of science and practice which tend to humble pride in scientific attainments.

That the apparently scientific and well-grounded belief of the celebrated scientist was a superstition became apparent as early as 1836. The company had a conductor insulated with hemp and pitch laid on the track of the road which was then in operation, between Leipzig and Athen,‡ by Professor Hülsse (now Director of the Dresden Polytechnic School). As, however, the cost *per mile* amounted to about 500 thalers [$365], and the arrangement at the same time appeared to be of little use for notifying the track-guards, the whole subject was "abandoned for the present,"§ in October, 1837. Thus was lost to Germany the honor of first bringing the noblest handmaid of the railroad into practical relations with it.

It was greatly against popular will, when in the years 1837 to 1839 the London & Greenwich Railway spanned with its arches the low houses and scattered stores and shops of the metropolis in Bermondsey and Rotherhithe, and still more unwillingly had the small shopkeepers of Surrey endured the racket, the puffing and the whistling of the locomotive, thundering eighty times a day in and out of Greenwich. When, therefore, the Blackwall Railway was extended into the heart of London, or into "the City" as far as the Minories, planting its columns in the houses of the great merchants in Finsbury street and the Whitechapel road, and wished to run its spark-scattering engines to the enormous warehouses of London and West India Docks, a loud cry of complaint arose against the "shrieking, rattling, noisy and dangerous locomotive."

It was proposed to the company to run the line without locomotives. Under this pressure rose the ingenious plan of Robert Stephenson to work the road with a rope, whereby all the cars at all stations were to be set in motion simultaneously; he proposed it only with reference to the telegraph apparatus which Wheatstone and Cooke had just invented, and had completely worked out on the then finished portion of the Great Western Railway.‖

Robert Stephenson ventured,¶ on the basis of those experiments, to construct the whole operating equipment of this costly road. He ran an endless rope between the rails of one track in one direction and between those of the other in the opposite direction, and set it in motion by means of a powerful steam engine at the Minories Station in London. To this rope, at all stations, London, Shadwell, Stepney, Limehouse, East India Docks and Poplar, the cars were fastened by means of an easily disconnected clutching apparatus, and released from the rope, which remained in motion, when their destination was reached. For this purpose, the most trustworthy communication between the stations was necessary.

By the side of the tracks, in iron pipes embedded in masonry and earthwork, were conducted six copper wires, insulated from one another by a spun covering of tarred hemp. These operated the pointers of the Wheatstone-Cooke five-needle instrument, which was put up at each of the above-named stations.

The apparatus answered its purpose perfectly, and during the three years from the opening of the London & Blackwall Railway on Aug. 2, 1841, until the time when the writer examined it (September, 1844), it had not failed to work a single hour or occasioned the slightest irregularity. It caused both surprise and wonder among all classes of the population of London.

The success of this first appearance of the electric telegraph in the service of the railroad not only encouraged railroad engineers to consider its further application, but so dazzled them, as it were, particularly by the certainty with which it worked, that even serious thinkers became enthusiastic over the revolutions that might be wrought in the just-born railway system through this wonderful invention, and among other things the abandonment of the second track was proposed. The effect was heightened by the appearance of Cooke's sensational publication, "Telegraphic Railroads" (London, 1842), which preached the modification of the entire railroad system on the basis of the great new discovery. For example, the Norwich & Yarmouth Railroad was at that time projected as a single-track road.* The telegraph line constructed according to Cooke's system cost between £250 add £300 sterling per English mile.

Brunel, whose quick mind grasped everything new, sometimes even too warmly, at once introduced the electric telegraph on the Great Western Railway built by him, whence the information of the arrival of the Prince Consort traveled like a wonder through the world.† It was here too that Wheatstone, applying Steinheil's discovery of a ground current, reduced the six wires, then still used between London and Slough, to one, and here the Bain printing apparatus first came into use.‡

By the end of 1844, the following railroads in England were provided with the electric telegraph:

Southwestern (Admiralty, London and Portsmouth).
London & Blackwall.
Great Western.
London & Dover.
London & Birmingham (between Northampton and Peterborough).
Leeds & Manchester.
Edinburgh & Glasgow.
Kingstown & Dalkey.

In the form of Wheatstone's apparatus, the electric telegraph passed into the railroad service on the continent in 1843, fully eight years after the German scientists had given the same subject their consideration, in the interest of the Leipzig & Dresden Railroad.

It made its first appearance on the inclined plane between Aachen and Ronheide. Wheatstone and Cooke had furnished the apparatus, the first here that possessed a pointer, set in motion on a dial by an electro-magnet, and which pointed directly to the intended letters. The service included four wires, two served the sounder and the others the pointing instrument.§

It was in its way, a very complete system and insured a rapid and certain understanding of everything happening on the inclined plane. The operation of this incline was effected by means of an endless rope set in motion by a powerful steam engine situated on the heights at Ronheide. The whole arrangement was really a copy of the mechanism of the London & Blackwall Railway, down to the apparatus for attaching the cars to the rope, which really could scarcely have been more ingeniously designed.

On another inclined plane, which was in operation two years before that of Aachen-Ronheide, from the year 1841 a signaling apparatus was in use, which was constructed on a principle very practical for the purpose and capable of being very usefully developed; it long did good service there.‖ It was founded on the principle of a pressure of air transmitted through long tubes, and consisted of a metallic tube laid from Hochthal to Erkrath, communicating at each end with a kind of gasometer. If one of these gasometers were pressed down, the air in the tube was compressed and sounded an organ pipe at the other end of the road. By the sequence of the sounds, the different meanings were expressed.

The same principle has recently been adopted for several purposes, particularly for telegraphing short distances; and under circumstances where the maintenance of batteries or magnets appears difficult, is even preferable to electricity. By Count Ambjörn Sparre and M. Walker at Paris it has been revived and developed with considerable success. The pneumatic telegraph constructed by these gentlemen is very ornamental and convenient in form, and satisfactorily does all that may be expected from a telegraph having only a small and limited number of signs to express with great exactness. So for railroad purposes, its application may here and there be entertained with advantage. The author sees in this principle one of the safest methods by which, for instance, one of the modern demands for the safety of passengers may be met with a near approach to reliability, namely, the communication between the passengers and the train and locomotive men.

Although the electric telegraph was first applied in Germany for an exceptional case on the inclined plane at Aachen, to Director Beil and Inspector Meller of the Taunus Railroad belongs the credit of first utilizing the remarkable discovery here in the ordinary service of the road.

Councillor Beil, with really remarkably insight, and in opposition to a large majority of railroad managers, constantly doubted the utility of the system of optical telegraphy so rapidly developed in North Germany in the years 1840 and 1841, and cherished as chief means of security; he even regarded it as a source of dangerous misunderstanding and irregularity.*

It was therefore at his suggestion that a bell signal apparatus was constructed on the Taunus Railroad between Höchst and Frankfort, which was to serve for the information of the road employés, and was at least unaffected by the weather. This apparatus consisted of loud bells, hung on cast-iron standards near the watch-houses, and operated by means of brass wire "pulls." These pulls ran in carriers attached inside of the rails, and the watchmen moved them by means of a treadle and bent lever. By this arrangement, only one signal, "attention," could be given, and this sufficed for the object aimed at.

Although this apparatus was indeed free from interruption through lack of atmospheric transparency, all the inconveniences were naturally attached to it that would follow the jerking movement of wire connections 1,000 and 1,200 metres (3,280 and 3,960 ft.) long, and which must result from the expansion and contraction caused by changes of temperature, or from accumulations of dust, ice, etc.

These disadvantages did not escape Messrs. Beil and F. Meller. The experiments with the apparatus were not extended, and when, in 1843, William Fardelly offered the railroad administrations his simple, cheap and easily-managed electric telegraph apparatus, which was only a modification of the Wheatstone dial instrument, the Taunus Railroad was the first to institute experiments, and the electric telegraph was introduced on the Caste-Biebrich-Wiesbaden section towards the end of 1844.†

Fardelly used only one wire (copper, 1½ millimetres in diameter). The line was constructed in the simplest possible manner. The wire rested on low, wooden posts, in a sawed notch at their upper end, in which it was retained by means of a wooden wedge. Wedge and notch were tarred and a little tin roof was nailed over all. This simple arrangement answered completely. The ground current was used to close the circuit, and the line cost only 600 guldens ($250) a mile. The instrument employed was the well-known Fardelly indicator, with a pointer, operated by a weight, which was released from an electro magnet; for a short time also the Bain printing instrument was employed.

The system used on the Taunus Railroad is also remarkable from the fact that the so-called air line, *i. e.*, a current conducted through a wire stretched above the ground, was here first practically employed on the continent.‡

To the first air line of all (with the exception of the above-mentioned experimental lines of Steinheil and Gauss, already referred to), which was built in the year 1844 by Cooke and Wheatstone, on the Southwestern Railway, from the London terminus to Maidstone, are attached two highly important facts, through which the entire telegraph system first entered the arena of modern times, where it was thenceforth to work as one of the noblest, darkness-dispelling instruments of the age.

First, the Southwestern Railway threw open its lines for public use for pay.§ For the first time this mighty agent was found in the people's hands.

Secondly, at the command of the government, when the apparatus had for some months worked reliably, the lines were extended to the Admiralty building, at Whitehall, and to Portsmouth. Immediately afterward, the only government optical telegraph line which still existed in England, after the operation of the lines to Plymouth, Yarmouth and Deal had been discontinued, in the year 1816, on account of their costliness, was given up and the electric telegraph of the railroad was thrown open to Admiralty uses, on payment of a yearly sum of £1,700 sterling.‖

The victory over the optical telegraph, in the struggle for the government business, was thus won completely.

The importance of these two facts cannot be exaggerated, and they really determine a great period in the history of electric telegraphy. We should be particularly grateful to Providence that telegraphy was first extended in a free country. How long, in many other countries, would not the governments have monopolized the use of this mighty means of intercommunication, closely controlling its development and operation?

The first air line of Cooke and Wheatstone was in many respects much more carefully constructed than that on the Taunus Railroad. The wire hung in porcelain carriers on iron rods, but at the same time the earth was not utilized for the return current. The air line rose in the estimation of experts by the experiments instituted under the direction of Arago, on the railroad between Paris and Rouen,¶ which proved that even where very incomplete insulating mediums were employed, the current of a weak battery, conducted one hundred kilometres and more, suffered so little decrease that it still fully sufficed for transmitting signals.

It is one of the peculiarities of the German mind, that it was chiefly theoretical motives which led the great majority of engineers to recommend under-ground lines when, toward the end of 1840, the construction of electric telegraphs for the service of the government and the public became general. It was only after the failure of the expensive experiments with about 5,000 miles of gutta-percha conductors that their opinion was led back to the simple air line, in its practical, easily inspected and sensible form. The

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* Records of the Leipzig & Dresden Railroad Company, Vol. I., fol. 5.
†(32.) Records of the Leipzig & Dresden Railroad Company, Vol. I., fol .13.
‡ Records of the Leizig & Dresden Railroad Company, Vol. 1., fol. 28.
§ Records of the Leipzig & Dresden Railroad Company, Vol. 1., fol. 29.
‖ Fourth Report of the Select Committee of the House of Commons on Communication by Railways, 1846.
¶ Almanack published by the Society for the Diffusion of Useful Knowledge, 1842.

* Almanack etc., 1862.
†*Times*, April, 1844.
‡*The Artizan*, 1844, No. 16.
§Supplement to the Organ for Railroad Progress, 1845, p. 90. Proceedings of the Institute of Civil Engineers, May, 1843.
‖Organ for Railroad Progress, pages 14 and 100.

* *Dingler's Journal*, Vol. 86, page 81.
† Records of the Dresden Railroad Company, Vol. 1, fol. 32; *Organ*, 1845, page 91.
‡ With the exception of the Gauss-Weber-Steinheil experimental wire from Munich to Bogenhausen.
§ *The Athenæum*, 1845, p. 906.
‖ Fourth Report of the Railway Committee of the House Commons, etc., 1840.
¶ *Moniteur Industriel*, 1845, p. 933.

spread of the electric telegraph on the railroads was comparatively slow, particularly in Germany, where toward the end of 1840 only a few lines were provided with it, among them the Saxon & Silesian line, which adopted it in 1846, and the Lower Silesian & Mark line, whose telegraph dates from 1847.

Although it may appear strange that an instrument so manifestly and highly important to the security of railroad operation, on account of the business advantage of constant immediate communication between all parts and stations of a line, particularly when the comparatively small cost is considered, was not adopted in the shortest possible time on all railroads: the cause is to be sought in the too general effort to secure arrangements that would answer several purposes at once, and which, for that reason, not unfrequently did not answer any of them satisfactorily.

(TO BE CONTINUED.)

Time Standards for the World.

The following is extracted from a paper read by President Barnard, of Columbia College, before the Association for the Reform and Codification of the Laws of Nations, at Cologne, Prussia, and recently printed in London:

In the United States of America and in Canada the desirability of the adoption of some universally-recognized system for the regulation of the divisions of the day has long been felt. * * * It is to be noticed, in the first place, that the time kept by clocks and watches in our country is not, generally, the exact local time of the place where the owners of such timepieces reside. Upon every great line of railway it is indispensable, in order to secure safety and regularity in the movement of trains, that the time kept should be uniform from end to end. And as some of these long lines extend over from five to ten degrees of longitude, while the standard time kept by them is usually that of one of their termini, it follows that, at different points of the road, the railway time differs from the local time, ten, twenty, thirty, or more minutes. Yet, such is the relative importance of the railway traffic, in comparison with that of interests purely local that, in practice, the railway time supersedes the local time, and all the affairs of life are regulated in accordance with it. In some large towns two kinds of time are kept; as for instance, at Buffalo, N. Y., where, in the same houses, may be found two clocks, one of them giving the time of the place, and the other that of New York city, which is the railway time, and is twenty minutes faster. It sometimes happens that towns not distant from each other are situated on different lines of railway keeping different times. In passing, by ordinary vehicles, from one of these towns to another there is experienced the inconvenience of finding one's watch entirely out of harmony with the timekeepers of the locality visited. But a still greater inconvenience occurs in those towns which lie at the intersections of two or more important roads—and there are a good many such—for here it is necessary to keep account of as many systems of time as there are intersecting ways. From an investigation made by Prof. Cleveland Abbe of the United States Weather Signal Office at Washington, it appears that the railway times kept by different transportation companies in the United States correspond to no fewer than seventy meridians, and the total number of such varieties is probably not less than 100. Now, so far as the transaction of the ordinary affairs of life in each particular locality is concerned, this extraordinary variety is of no consequence to the inhabitants. But in all matters which concern the mutual relations of the inhabitants of different places the case is otherwise.

It has seemed to us that by the adoption of a system according to which all timekeepers throughout the world might be made to agree as to the minute and second, and to differ only, as longitudes differ, in regard to the hour, all the confusion which exists in consequence of the present variety of time-standards might be wholly eliminated, to the great benefit of the people of all civilized lands. The adoption of this system would involve the recognition of twenty-four fixed meridians, distant from each other by a constant difference of fifteen degrees of longitude, and determined in position by some one of the number distinguished as the prime or zero meridian. The moment of the passage of the mean sun over each of these meridians is to be regarded as the hour of mean noon for that meridian and for all places which are nearer to it than they are to any other. Thus the largest difference which can occur between conventional time and the true local time will be thirty minutes, and the hour will change at a line half-way distant between any two meridians. * * *

It was proposed to adopt, for the American Continent, five meridians, of which the central one should be situated six hours west of Greenwich, and should pass almost centrally through the city of New Orleans. The time of this meridian being that prevailing through the principal states of the Mississippi Valley and the British province of Manitoba, is distinguished as valley time. The five-hour meridian passes near New York, and governs the states lying on the Atlantic, together with the two Canadas, giving them what is hence called Atlantic time. The four-hour meridian crosses the island of Newfoundland, and gives what is called Eastern time to that island, and to Nova Scotia, New Brunswick and the remaining British possessions east of Canada. The seven-hour meridian passes through the city of Denver, and almost exactly over the United States signal station on the summit of Pike's Peak, more than 14,000 feet high, in Colorado. It gives time to the states, territories and provinces lying on and about the great central ridge of the Continent, which is hence called mountain time. The eight-hour meridian falls a little east of San Francisco, and almost exactly on the small seacoast town of Santa Barbara, in California. From this the states of the Union which lie on the Pacific, and the British provinces on the same ocean, derive their time, which it is proposed to distinguish as Pacific time.

Two or three minor features of the scheme contained in the resolutions proposed remain to be mentioned. The first of these is the proposition to abolish the present division of the day into two equal portions of twelve hours each, and to employ instead a continuous count running from one to twenty-four hours in each day. The division at present in use is not a natural one. It is founded, presumably, upon the custom of astronomers to begin the day at the meridian passage of the sun, or the habit of the people to fix the moment of apparent noon by observing the coincidence of the shadow of a vertical stile with a line drawn north and south. The natural division of the day is into a light portion and a dark portion. These portions are always and everywhere unequal, except for a single day in the year, or for a single great circle of the earth—the equator. No exact system for the uniform division of time can therefore be founded upon them. On the other hand, no disadvantages can arise from regarding the day as a unit, subdivided into twenty-four equal fractions, a mode of division once very general, at least in Italy, and hardly yet entirely abandoned; while there are very appreciable disadvantages attending the present division into twelve hour moieties. The first of these is the necessity of using always in speech the word forenoon or afternoon, in order to identify the portion of the day to which any hour which happens to be mentioned is to be referred; or, in writing, to place after the number of the hour the explanatory suffix a. m. or p. m. Another and even greater is the uncertainty in railway time-tables as to whether a particular hour is an hour of the night or of the day. The compact form of these tables renders it impossible always to introduce the necessary specifications in their columns, and the inquirer is thus often left at a loss. Some of these tables, in order to remove the embarrassment, have employed the expedient of printing the hours of the night in white letters upon a black ground, while those of the day are printed in the usual way with black letters upon a white ground; but the very adoption of this expedient is a confession of the existence of an evil which we may easily perceive to be quite unnecessary. Let the hours of the day be only continuously numbered from beginning to end, and there will never be any uncertainty as to which part of the day is meant.

Accidents to Employes on British Railroads.

During the six months ending June 30 last there were, according to the *Engineer*, 226 servants of British railway companies or contracters reported as having been killed and 1,092 injured. Of these, 15 were killed and 186 injured while coupling or uncoupling vehicles; 3 were killed and 12 injured by coming in contact, while riding on vehicles during shunting, with other vehicles, etc., standing on adjacent lines; 22 were injured while passing over or standing upon buffers during shunting; 18 were killed and 131 injured in getting on or off, or by falling off engines, wagons, etc., during shunting; 2 were killed and 75 were injured while breaking, spragging, or chocking wheels; 5 were killed and 20 injured while attending to ground points, marshaling trains, etc.; 2 were killed and 59 injured while moving vehicles by capstans, turntables, props, etc., during shunting, and 13 were killed and 107 injured by various other accidents during shunting operations; 5 were killed and 13 injured by falling off engines, etc., during the traveling of trains; 4 were killed and 7 injured by coming in contact with over-bridges or erections on the sides of the line during the traveling of trains; 15 were injured while getting on or off engines, vans, etc., during the traveling of trains; 4 were killed and 44 injured while attending to, or by the failure of, machinery, etc., of engines in steam; 60 were killed and 72 injured while working on the permanent way, sidings, etc.; 3 were killed and 4 injured while attending to gates at level crossings; 43 were killed and 106 injured while walking, crossing or standing on the line of duty; 18 were killed and 104 injured by being caught between vehicles; 14 were killed and 67 injured by falling or being caught between trains and platforms; 15 were killed and 8 injured while walking, etc., on the line on the way home or to work; and 2 were killed and 40 injured from various other causes.

The following table gives the number of killed and injured and the number of locomotives in England, Wales, Scotland and Ireland, with the number of locomotives for each person killed and injured in each. These figures are taken from the Board of Trade report for last year.

In Operating Road.	Number of employés killed.	Number of employés injured.	Number of locomotives.....	Number of locomotives to each employé killed.....	Number of locomotives to each employé injured.....
England and Wales..	441	1,709	11,172	25.3	6.5
Scotland.....	90	350	1,618	17.9	4.6
Ireland	15	21	594	39.6	28.3
Total killed and injured in operating road ...	546	2,080	13,384	24.5	6.4
Employés killed and injured in workshops, warehouses, etc....	31	2,035	....	....	.....
Total employés killed and injured from all causes	577	4,115	.....	23.2	3.25

A Federation of State Railroad Commissioners.

We have heretofore published letters from Commissioner Johnston, of Kentucky, and Commissioner Bragg, of Alabama, on the question of the establishment of a Federal or inter-state railroad commission; we give herewith a third letter, written by Railroad Commissioner George C. Pratt, of Missouri, addressed like the others to Major Campbell Wallace, of the Georgia Commission:

DEAR SIR: Some kind friend has sent me a copy of the Atlanta *Constitution* containing the plan for a United States railroad commission, suggested by the Hon. J. Fletcher Johnston, Chairman of the Kentucky commission, and indorsed by you.

I wish to say that I also approve that plan, as you will see by an item in the *Tribune* of this (Jefferson) city, a copy of which is herewith mailed to you. In fact, I think it a happy hit, and hope that Commissioner Johnston, or whoever may draft the act of Congress on this subject, which may finally become law, may be as happy in defining the powers and duties of that commission.

In this country most railroad franchises are granted by the state governments. Railroad companies are created by them to be public servants as common carriers, and my mind is perfectly clear as to the right and duty of the state to supervise their operations. In creating railroad commissions for this purpose, we have, I think, made the right move, as is shown in the pamphlet on "Transportation by Railroad," herewith mailed to you. But as to the precise powers to be given to, and the duties to be imposed, upon such commissions, or, in the language of the paper quoted by Commissioner Johnston, "The principle on which state laws regulating rates of transportation by railroads should be based," I confess that after six years' constant study of these matters, I am yet open to conviction and would be glad to have a report on the subject from a committee of experts.

As to Congressional action, I have been of the opinion that when we shall have perfected the mode and manner of state supervision, we will be better prepared to approach the subject of supervision by the general government. Unquestionably Congress has the right to regulate inter-state commerce, but the principles applicable in the states will doubtless apply to the United States: so that when these are settled in respect to the former, there will be little difficulty in regard to the latter case.

In the elucidation of these subjects, I think the country has a right to expect that railroad commissioners shall take the lead, and I am willing to meet with the others once or twice a year, and to take time for a full discussion of all subjects that any commissioner may bring forward.

Very respectfully, your obedient servant,

GEORGE C. PRATT,
Commissioner.

RAILROAD LAW.

Police Powers of Conductors in Georgia.

The following act was passed by the Georgia Legislature at its last session, and approved Sept. 13, 1881:

SECTION 1. Be it enacted by the General Assembly of the state of Georgia, and it is hereby enacted by the authority of the same, that, from and after the passage of this act, the conductors of every train carrying passengers within this state are hereby invested with all the powers, duties and responsibilities of police officers, while on duty on their trains: Provided, nothing herein contained shall affect the liability of any railroad company for the acts of its employés.

SEC. 2. Be it further enacted by the authority aforesaid, that when a passenger is guilty of disorderly conduct, or uses any obscene, profane or vulgar language, or plays any game of cards, or other game of chance for money, or other thing of value upon any passenger train, the conductor of such train may stop his train at the place where such offense is committed, or at the next stopping place of such train, and eject such passenger from the train, using only such force as may be necessary to accomplish such removal, and the conductors may command the assistance of the employés of the company and of the passengers on such train to assist in such removal; and said conductor may cause any person or persons violating the provisions of this act, and which are in violation of the laws of this state, to be detained and delivered to the proper authorities for trial as soon as practicable.

SEC. 3. Repeals conflicting laws.

In a circular communicating this act to its conductors, the Georgia Railroad Co. adds the following caution:

"Unless a specially aggravated case, you will not strictly carry out the provisions in Section 2, which permits the ejectment of passengers at the point where the offense is committed, but take them to the next station."

THE SCRAP HEAP.

Locomotive Building.

The Lima Machine Co., at Lima, O., purposes entering upon the manufacture of narrow-gauge and other light locomotives. The company will also make car wheels.

The Manchester Locomotive Works, at Manchester, N. H., recently shipped several engines to the Sonora Railroad in Mexico.

The Rhode Island Locomotive Works in Providence have recently completed three Forney engines for the Providence & Worcester road. They have 16 by 20 in. cylinders, 52 in. drivers, and are to be used for local passenger service.

The Baldwin Locomotive Works in Philadelphia have recently completed four narrow-gauge consolidation engines for the Cairo & St. Louis road, and are building several more.

The Danforth Locomotive Works at Paterson, N. J., are turning out several Mogul freight engines for the East Tennessee, Virginia & Georgia road.

Tests of Locomotives.

The Shaw double-cylinder locomotive has made several trips over the Camden & Atlantic road, where it is now on trial. It has so far developed no extraordinary speed, but has several times run the 60 miles from Camden to Atlantic City in 90 minutes, running very smoothly and steadily.

The Pennsylvania Railroad Company has finished its trial of the Fontaine engine, having run it both on freight and passenger trains, and has declined any further tests. The engine has been sent to the New York Central road, where it is to have a full trial.

The Completeness of Combustion in Locomotives.

A number of measurements were recently taken by Herr Fischer on locomotives of the Hanover & Bremen Railway, with a view to ascertaining the amount of combustion of fuel. The gases were drawn off at different times from between the plate over the fire-tubes and the steam outlet above; they were conducted through a rubber tube to a gas apparatus in a wagon behind the tender. A graphite thermometer gave the temperature under the steam outlet. The fuel was coal. Putting aside those samples that were taken while the door was open on account of excessive steam, the smoke-gases during one journey are shown to contain about 12 per cent. carbonic acid, at a temperature of 300 deg. to 350 deg. When the locomotive was standing still, the CO_2 increased to 17.5 per cent. (owing to less draught); the oxygen disappeared almost wholly, and there was some carbonic oxide, while the temperature fell to 250 deg. Similar figures were obtained on other trips. There was never more than 2.1 per cent. of unburnt gas. Considering the disadvantageous condition of working locomotive as compared with stationary boilers, the results are regarded as highly favorable. The table shows that on one journey, only 15 to 20 per cent. of the entire heat was lost through the chimney, whereas, with station ry boilers, twice as much is often so lost.

Compressed Air for Locomotives.

In a discussion of a paper on this subject at the recent meeting of the English Institution of Mechanical Engineers Mr. J. Tomlinson, Jr., Engineer of the Metropolitan Railway, said that he had made a few runs with the six-cylinder Beaumont car on this railway, and it was proved to be useless there, whatever it might be on tramways. The cost of hauling a train of 150 tons by the steam locomotives was only 1½d. per mile as compared with even Mr. Moncrieff's ½d. per mile for his one air-propelled car weighing 7 tons 7 cwt. He had made an estimate of the cost of introducing such a system for the Metropolitan Railway, and found that 26 Cornish boilers 40 ft. in length would be required night and day to provide compressed air for the engines that ran out of Aldgate alone. These, with the engines and machinery and other plant, would require about 5 acres of land, and altogether it would cost more than the whole of the engines on the line and their working for a long time. The air engine had no recuperative power, and for many reasons could not be successful for traffic such as that on the Metropolitan Railway.

Electric Head-Light for Locomotives.

Engineering gives the following account of experiments in the use of the electric light for this purpose: "In last March the Austrian Prince Rodolphe Railway Company commenced a series of experiments on the use of electric lighting on locomotives. For this purpose a small steam

engine and dynamo machine were mounted on the boiler; the lamp was movable, and could be turned in any direction by the engine-driver. After a good many trials with different lamps, it was found that those on the Sadlaczek system gave the best results, the light remaining steady and unaffected by vibration. The road was perfectly illuminated for 500 yards ahead of the lamp."

Car Notes.

The shops of the Georgia Car Co. at Cartersville, Ga., are turning out from 15 to 20 freight cars a week, and have plenty of work on hand.

Car shops are to be built at Logan, O., for the Columbus, Hocking Valley & Toledo Company.

The Utah & Northern shops at Eagle Rock have just finished the first car ever built in Idaho. The car is 48 ft. long, intended to accompany the wrecking and repair train for the accommodation of its crew.

The Cobourg Car Works at Cobourg, Ont., are working on a contract for box cars for the Credit Valley road.

Arrangements have been made to organize a company to establish car works in Camden, N. J. A tract of land adjoining the West Jersey road has been secured.

The Ontario Car Co. at London, Ont., is running its works on box and flat cars for the Credit Valley road.

The Oswego & Syracuse shops at Oswego, N. Y., are building 50 box and 50 flat cars for use on the road, besides doing the usual repair work.

J. G. Brill & Co., in Philadelphia, recently delivered two passenger cars to the Cairo & St. Louis road.

The LaFayette Car Works at LaFayette, Ind., are building 400 freight cars for the Northern Pacific road.

We are informed by Mr. Simeon Brownell, President of the United States Car Co., at Chicago, that the followin companies are building its improved pattern spring-leverg dump cars and contemplate equipping their road, with them: Chicago, Rock Island & Pacific; Union Pacific; Chicago & Alton; Chicago & Northwestern, and Chicago, Milwaukee & St. Paul. The Joliet Steel Co. has increased its order from 25 to 100 cars. The New York City & Northern road has one car in service and is about closing a contract to adopt them as its regular dump car.

Heating Foot-Warmers with Acetate of Soda.

A method of heating foot-warmers for railway carriages patented by M. Ancelin, which will be somewhat novel to American readers, is described as follows in the London *Engineer*: "It consists simply of the substitution of certain fusible salts, such as acetate of soda, for the hot water usually employed. The acetate fuses at about 138 deg. Fahr., and during liquefaction absorbs a large amount of heat, which is, of course, given out again in cooling. A foot-warmer charged with fused acetate at a temperature of say 176 deg. Fahr., would in cooling to say 108 deg., give out about four times as much heat as the same warmer filled with water at the same temperature. The warmers filled with the acetate also have the advantage of remaining for a long period at a surface temperature of a little over 130 deg., this corresponding with the internal crystallizing temperature of the acetate. The warmers charged with the acetate are reheated without being emptied, by immersion in boiling water, the vessels being filled once for all and soldered down perfectly airtight. The system has been successfully tested in France on the Western and State railways, and is about to be adopted on the Royal Portuguese railways and the railways of Northern Italy, while in England it is being introduced by Mr. Henry Chapman, and the London & Northwestern Railway have already, we hear, taken out a license for 3,000 warmers."

Failure of Tires and Axles on British Railroads.

Of the 780 tires which failed on the railways of the United Kingdom during the six months ending June 30 last, 47 were engine-tires, 23 were tender-tires, 5 were carriage-tires, 35 were van-tires, and 670 were wagon-tires; of the wagons, 551 belonged to owners other than the railway companies; 581 tires were made of iron, and 199 of steel; 28 of the tires were fastened to their wheels by Gibson's patent method, 18 by Beattie's patent, 10 by Mansell's patent, and 27 by Drummond's patent, all of which remained on their wheels when they failed; 682 tires were fastened to their wheels by bolts or rivets, of which 5 left their wheels when they failed, and 15 tires were secured to their wheels by various other methods, none of which left their wheels; 109 tires broke at rivet holes, 195 in the solid, 2 at the weld, and 474 split longitudinally or bulged.

Of the 291 axles which failed on our railways the first half of this year, 149 were engine-axles, viz., 138 crank or driving, and 11 leading or trailing; 23 were tender-axles, 109 were wagon-axles, and 10 were axles of salt vans; 52 wagons, including the salt vans, belonged to owners other than the railway companies. Of the 138 crank or driving-axles, 87 were made of iron and 51 of steel. The average mileage of 80 iron axles was 181,988 miles, and of 47 steel axles 172,328 miles. Of the 381 rails which broke, 307 were double-headed, 71 were single-headed, 1 was of the bridge pattern, and 2 were of the Vignoles' section; of the double-headed rails, 221 had been turned; 221 rails were made of iron and 160 of steel.—*The Engineer.*

Method of Painting Cars in the Midland (English) Railway Shops.

The process of painting cars in the Derby shops of the Midland Railway was briefly described as follows by the foreman of the paint shop at that place:

The car or carriage is first given two coats of priming, then four coats of filling, composed of 120 lbs. of slate powder, 30 lbs. of white lead ground in oil, 13½ lbs. of gold size, 13½ lbs. of varnish, 2 lbs. of boiled oil, with enough turpentine to mix the powder. After the filling is done it is rubbed down with pumice stone and two more coats of lead color are put on and the work is then stopped with hard stopping. It is then again faced down with pumice and another coat of lead color is put on and then sand-papered. This is followed with one coat of brown, two coats of lake, one of lake and varnish and one of varnish. The ornamenting is then done and the car finished with three coats of varnish. Each coat is rubbed down with ground pumice and cloth. The whole process takes about a month.

Bridge Notes.

The Clinton Bridge Co. at Clinton, Ia., has lately completed two combination bridges over the Big Muddy River in Illinois, for the Cairo & St. Louis road.

The Passaic Rolling Mill Co. at Paterson, N. J., has lately been shipping large quantities of bridge-work from its mill.

Iron and Manufacturing Notes.

The St. Albans Rolling Mill, at St. Albans, Vt., is running on rails for the Central Vermont. Orders for several months are on hand.

The Railway Barb Fencing Co. at Cuyahoga Falls, O., has a contract for 50 miles of fencing on the Dayton & Southeastern road.

Hecla Furnace, near Ironton, O., is running on car-wheel iron.

Centre Furnace, near Ironton, O., is running steadily on cold-blast car-wheel iron, its product all going to the Pullman shops at Chicago.

Another new blast furnace is to be built at Birmingham, Ala., at once.

Riverside Furnace at Wheeling, W. Va., in the week ending Nov. 6 made 829 tons and 570 lbs. of pig iron, with an average consumption of 62.47 bushels of coke per ton of iron. The furnace is 75 ft. high and 16½ ft. bosh.

During the ten months ending Oct. 31 last the steel works of the North Chicago Rolling Mill Co. made 103,329 gross tons of Bessemer steel, making 15,780 blows averaging 6.54 tons each. The rail mill turned out during the ten months 86,124½ tons of steel rails.

The Ligonia Rolling Mill at Portland, Me., which has been idle for some time, has been sold to H. N. Jose and others, who intend to start it up at once. It will be known as the Portland Rolling Mill.

All the furnaces in the Hocking Valley are now, it is said, in blast, except Moxahala Furnace, which is to be started up as soon as repairs are finished.

The Chateaugay Iron Co. is preparing to build a large blast furnace on its property at Lyon Mountain, N. Y., about two miles from the Chateaugay Railroad. A spur from the road will be run to the furnace.

The Powell Iron & Nail Co., at Chattanooga, Tenn., has taken a contract to supply joints and rail-fastenings for 275 miles of the Texas & St. Louis road.

The rolling mill at Rome, N. Y., is furnishing rails for the Genesee Valley road.

The Rail Market.

An upward tendency is observed in steel rails, and it is difficult to get a lower quotation than $62.50 per ton at mill, with possibly a little higher price when date of delivery is an object. Foreign rails are also higher.

Iron rails are quieter, and no large transactions are reported, although the mills are gradually working off their orders and getting ready for new contracts. Quotations are from $47 to $48 per ton at mill for 56 lbs. up to $52.50 for light rails. Sales of foreign rails in store have been reported at $45.50 to $47 per ton.

Spikes are still quoted at $3.15 per 100 lbs.; fish-plates, $2.60; track-bolts, $3.25 to $4. A slight advance is generally asked for early deliveries.

Steel blooms are unsettled, buyers generally being unwilling to go over $46 per ton, duty paid, while importers ask something more.

Old iron rails are scarce, and most sales are now made to arrive. Quotations in Philadelphia are as high as $30 per ton for tees and $32 for double-heads.

British Rail Exports.

For the month of October and the ten months then ending the exports of iron and steel rails from Great Britain to the United States and to all countries, have been, in tons of 2,240 lbs., for the past three years.

October:	—To United States.—			—To all countries.—		
	1879.	1880.	1881.	1879.	1880.	1881.
Iron	5,971	3,573	4,981	8,226	6,705	7,370
Steel	481	14,092	14,327	29,595	40,444	61,446
Total	6,452	17,665	19,308	37,821	47,149	68,816
Ten months:						
Iron	14,731	82,328	88,479	43,781	116,588	108,606
Steel	13,682	106,958	171,100	283,989	408,280	512,370
Total	28,413	189,286	259,579	327,770	524,848	620,976

The total rail exports to the United States in October were about 10 per cent. more this year than last, the increase being chiefly in iron rails. These exports, however, are a quarter less than in September or any other month since February. The exports to all countries in October were 46 per cent. more than last year. British North America imported 11,447 tons that month, Australia, 11,683, and "other countries," to which usually exports are slight, 16,083, most of these being, we imagine, to Mexico.

For the ten months ending with October the exports to the United States were sufficient for 2,950 miles of track of 56 lbs. rails, and were 37 per cent. more than last year and *nine times as much* as in 1879. The exports of iron to this country have not been much more (6,151 tons) than last year; but the steel exports have been 64,142 tons, or 60 per cent. more. Yet more than four-fifths of all the exports of iron were to the United States. All other countries put together took but 20,127 tons of iron rails, while they took 341,270 tons of steel. The countries besides which show considerable increases for the ten months are Brazil, British North America and Australia, with a large decrease to British India. British possessions took 207,114 tons (33½ per cent. of the whole) this year, against 225,533 tons (43 per cent. of the whole) in 1880.

A Strange Ride.

On Nov. 25, when the Orange County express on the New York, Lake Erie & Western road reached Turners, the people at the station were astonished to find a woman on the front of the engine. The engineer was equally surprised, for he was quite unaware that he was carrying a passenger. Further investigation showed that the woman—a Mrs Crowley—had been thrown up on the front of the engine at Paterson by the pilot, the engine striking her at a street crossing there. She was not seriously hurt, but had been stunned by the blow and laid perfectly still where she landed through her involuntary ride of 30 miles without a stop. She was well enough to go home a day or two after. A woman who was with her says she was a little drunk at the time.

Quick Time with Freight.

Goods are collected in Manchester, 188 miles from London, up to 8 p. m. by the London & Northwestern Company, when their express goods train leaves for London. The goods thus forwarded are delivered in the city by 9 o'clock the next morning, being thus done in about 12 hours, or little less time than letter service.

Engineers' Club of Philadelphia.

At the regular meeting of this Club in Philadelphia, Nov. 19, Past-President Frederic Graff occupied the chair, and 23 members and two visitors were present.

Mr. S. Castle Gant presented an illustrated description of his proposed underground railroad connections, for freight and passengers, in Philadelphia. The general scheme contemplates the construction of the following system of lines. Descending, with four tracks, on the main line of the Philadelphia & Reading from Thompson street to the beginning of the tunnel proper at Spring Garden street, it would follow the line of the latter to Broad street, where it would meet a two-track line from the Delaware front, *via* Ninth & Green streets depot (where connection would be made by hydraulic lifts or inclined plane), or, should that depot be abandoned, by a four-track tunnel up Broad street to the present Reading and Pennsylvania railroad crossings. From Broad and Spring Garden streets the united lines would continue, *via* the present and proposed Reading depots, by a diagonal avenue to Fourth and Market streets. At this point it would be joined by a two-track tunnel from the West Philadelphia yard of the Pennsylvania road by tunnel under the Schuylkill River, or by hydraulic lifts or inclined plane from present elevated road, leading down Filbert street and around the City Hall, and also by a two-track tunnel from the Baltimore depot *via* Broad street.

These concentrated lines would then pass down Market street, *via* central depots on both sides of the street between Fourth and Fifth streets, to the Delaware River. Here it is proposed to build a floating dock of 142 acres, from Market street to Washington avenue, by inclosing with embankments the space between the present shore and islands, bounded on the north by a tidal dock of 38 acres; to extend the wharf line in conformity therewith to the Richmond coal wharves and to build a dam across the back channel of Treaty Island. High and low level lines would be constructed along this new river front and by means of the former the largest vessels could be loaded without elevators. The purity of the dock water could be maintained by intercepting sewerage.

With regard to cost, Mr. Gant estimates that the four-track tunnel from Pennsylvania avenue, *via* Spring Garden, Broad, the diagonal avenue and Market street to the Delaware River, and the two-track tunnel from Willow street and Delaware avenue to Broad and Spring Garden streets, would cost $1,750,000, exclusive of purchase of property, the value of which he considers would be enhanced by the opening of the proposed avenue.

He suggests this scheme as only the beginning, in Philadelphia, of underground railroads, in so many particulars, for both passenger and freight traffic, to be preferred to surface or elevated roads.

The remainder of the evening was occupied in discussing several proposed new quarters for the Club.

Robbing an Express Car.

A bold and daring burglary was perpetrated on one of the cars belonging to the American Express Co., on the train known as the Cincinnati express, due in this city about 7 o'clock yesterday morning. On account of the enormous quantity of freight shipped by the company at this season of the year, from two to four cars are attached to trains, the car containing merchandise from the West consigned through to the metropolis and other Eastern points being under the care of sometimes one and at others two messengers. The train due in this city yesterday at the time stated numbered two express cars, and from what can be learned, was in charge of one messenger.

Between Fonda and Utica the forward car was boarded by thieves, who forced open the door, and after considerable time had elapsed in effecting an entrance, commenced work in throwing packages out of one of the side doors. The train was rolling at rapid speed, and consequently the burglars had but little time to rob the car of its contents. The messenger was in the rear car tallying freight consigned to local points, and the noise attending the moving of the train deadened that made by the burglars while effecting an entrance into the car ahead. A strict rule is enforced by the company to have the several cars thoroughly examined at every station, and yesterday, when the train arrived at Fonda, the employés of the company discovered what had taken place. The company's agent at Fonda at once took possession of the freight consigned to that place, and instituted search along the road for the missing goods, surmising that the car-breakers had thrown the packages from the car and then, with accomplices, surveyed the tracks for some distance and collected their plunder. His search proved successful, for he had not proceeded a great distance before package after package was discovered along the embankment. At a later hour the agent came upon a stranger endeavoring to sell goods to storekeepers in Fonda, and entertaining suspicions regarding him, he caused his arrest. When taken into custody he finally confessed to the theft. A considerable amount of the property was recovered, and through the confessions made by the prisoner it is quite likely that the remainder will soon be recovered, and the entire gang arrested, if they have not been already. The stolen property consisted principally of shoes and clothing.—*Albany (N. Y.) Argus, Nov. 26.*

A Quicksand Section.

Underneath the surface of the ground, and directly overlying the rocky formation of the "Portage group" of rocks contiguous to the falls of the upper Genesee River, in the towns of Genesee Falls, in Wyoming County, N. Y., and Portage, in Livingston County, is a stratum of quicksand of the most treacherous character, jeopardizing the construction of any public works that may be built thereon. The celebrated "slide section" of the Genesee Valley Canal, opposite the Middle Falls of the Genesee, has passed into history as the most expensive piece of earthwork ever maintained, not only in this state, but the United States. This section, one mile in length, has cost more money than any 20 miles of the same canal between Rochester and Orleans. To maintain navigation upon this particular piece of work not only cost fabulous sums of money, but baffled the scientific knowledge of the engineering corps of the state, and to-day, but for the abandonment of this thoroughfare as one of the waterways of the commonwealth, the problem would still be a vexed question in the brains of the state officials.

To-day, upon the opposite bank of the river, but little to the westward, the New York, Lake Erie & Western Railroad have, in order to lessen a 40-ft. grade, between Portage Bridge and the village of Castile, put in a loop line, which leaves the old road-bed directly after crossing the bridge and passes over a deep ravine with an embankment about 80 ft. in height, where it makes a sharp detour through a hill of quicksand, with a cutting of about 40 ft. The embankment at this point, which is made from the surplus material in the cutting, is about 600 ft. in length. At the bottom of the ravine is a culvert, built upon pile foundations extending down to the rock. The superincumbent weight of earth upon this treacherous mass of natural earth has caused the whole to sink, while the lower material is making preparations to move down the ravine. Already, large forest trees have been carried downwards toward the river bank, and fears are entertained that, as the soil becomes permeated with moisture, the whole embankment will slide out of position. The bed of the present track has moved far enough to take out the alignment of the curve, and the track-repairers, who have raised the bank three times within as many months, have substituted a short tangent, to accommodate the running trains. The culvert in the new road-bed has become to some extent demoralized, and information is now wanted how to hold the track to its original survey. When the new loop line shall have been brought into use, the vigilant care of the railroad officials, no doubt, will prove equal to the emergency, and before traffic is carried over this new line, measures both vigorous and remedial will be instituted.—*Buffalo Express.*

Married on a Train.

A novel wedding of first-class people near Macon. A train pulled up at a station, when a couple suddenly stood up in the aisle of a coach, and there in the presence of the astonished passengers were made man and wife; the whistle sounded and the happy pair sped away to the exposition at Atlanta. The affair was not, as would appear at the first glance, a runaway match. It was only a scheme to avoid the wedding cards, wedding breakfast, claw-hammer and white dress nonsense.—*Columbus (Ga.) Enquirer.*

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE BALTIMORE & OHIO REPORT.

Last week we published an abstract of the report of the President of the Baltimore & Ohio Railroad Company for the year ending with September—the first of the trunk-line reports for the year. In considering it and the comparisons made by us in this summary with the report of the previous year, we should remember that 1879-80 was for this road, as for many others, one of extraordinary progress and prosperity, due not only to an enormous traffic, but also and largely to well-maintained through rates and to comparatively low prices for wages and materials. These latter, it is true, were somewhat higher than for several years previous, but they had then only begun to advance, and though this road, in common with many others, showed an enormous increase in the amount of working expenses, this was largely due to the making of an undue proportion of renewals, etc. In that year compared with 1879 there was on the "Main Stem and Branches" an increase of no less than 42 per cent. in expenditures for repairs of road, 64 in repairs and renewals of depots, 42 in repairs and renewals of locomotives, and 63½ per cent. in repairs and renewals of cars. Advantage, evidently, was taken of the extraordinarily large earnings to do work which had been put off in previous years, when profits were small.

The gross and net earnings and the working expenses of the whole system of the Baltimore & Ohio Railroad for eight successive years have been:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1873–74	1,166	$14,947,090	$9,461,651	$5,485,439
1874–75	1,314	14,444,239	9,908,665	4,535,574
1875–76	1,430	15,031,236	9,609,857	5,421,379
1876–77	1,474	13,208,860	8,226,055	4,982,805
1877–78	1,456	13,765,280	7,769,301	5,995,979
1878–79	1,449	14,193,981	7,691,596	6,505,385
1879–80	1,467	18,317,740	10,330,770	7,986,970
1880–81	1,512	18,463,877	11,390,479	7,073,398

The increase in mileage last year was due to the opening of the Somerset & Cambria Branch, which was worked but eight months of the year.

The increase in gross earnings over the previous year was but trifling—$146,137, or 0.8 per cent. But the increase in expenses, which had been enormous the year before and altogether out of proportion to the increase in traffic (for the increase in earnings then was then largely due to higher rates), continued last year and amounted to $1,059,709, or 10.2 per cent. (in our abstract last week erroneously stated as $959,709 and 9.2 per cent.). This increase in expenses was probably in part due to larger traffic, but also in part to higher prices. No definite statistics of traffic and no statements of train mileage are given in this report, so we cannot measure the proportion of expense to work done. We know, however, that during the year covered by the report the through traffic was very large. Baltimore's share of the eastbound traffic, however, was somewhat smaller than before, and the Baltimore & Ohio's share, especially in the latter part of the year, was unusually small. It is usual to exaggerate both of these. Much is said of the great growth of traffic at Baltimore, without regarding the fact that its only heavy traffic is in wheat and corn; in flour, provisions, petroleum and live stock its business is comparatively trifling. Again, the traffic of Baltimore is generally regarded as almost exclusively carried by the Baltimore & Ohio Railroad, when in fact the Northern Central brings thither not very much less through freight. Of all the through freight reaching Baltimore from points west of the Ohio and other Western termini of the trunk lines last year, not much more than half was brought by the Baltimore & Ohio.

In fact, though its influence over trunk-line rates and agreements has been very powerful for several years, the Baltimore & Ohio has a comparatively small share of the whole trunk-line through traffic—certainly not more than 10 or 12 per cent. of it, and often much less. The Grand Trunk, which it has been the fashion to look upon as an interloper among the trunk lines, probably now carries more trunk-line freight east, though, as it gets hardly any share of the New York business, it may not carry as much west.

Thus anything which affects the profits of the trunk-line traffic, whether it be a change in the amount of business or a change in rates, must make a much smaller difference in the earnings of the Baltimore & Ohio than in those of some other trunk lines. One of them carries, probably, between three and four times as much through freight, and a still larger proportion of through passengers. We may, however, easily mistake the effects of a certain amount of gain or loss on different companies. In the first place, the Baltimore & Ohio works a whole system of feeders west of the Ohio, equal to more than one-third of its total mileage, and has the whole of their gains and losses. The New York Central and the Erie have the profits and losses only of the lines east of Buffalo and Dunkirk. When a rate is reduced 20 cents per 100 lbs. from Chicago to New York and Baltimore, the New York Central receives about $1.76 less on every ton it carries: the Baltimore & Ohio $4 less on shipments from Chicago. On shipments from St. Louis, Louisville and Cincinnati, however, the Baltimore & Ohio is in the same position as the New York Central, as it does not work the lines west of the Ohio, which bring it traffic from those places, though it controls them.

Again, the same amount of loss or gain may be a great matter to one company and comparatively a small one to another, and this about in proportion to the amount of capital stock. An increase or decrease of $150,000 in its net earnings is equal to a dividend of 1 per cent. on the common stock of the Baltimore & Ohio; but to only about ⅛ of 1 per cent. on the New York Central stock, ⅕ on the Erie, and (since the purchase of the Philadelphia, Wilmington & Baltimore) to ⅙ on the Pennsylvania stock. The Baltimore & Ohio's decrease in net earnings last year was equivalent to more than 6 per cent. on its common stock, and yet the net earnings were much larger than in any year previous to 1879-80.

We have sometimes expressed the opinion that the through business on the Baltimore & Ohio is a larger proportion of the total than on other trunk lines. More definite knowledge of the actual amount of its through traffic leads us to doubt this, and at least its *earnings* from local traffic must greatly exceed its through earnings. From its situation it commands higher local rates than the other trunk lines, in much of its territory, and though its local traffic is thin on several of its lines, yet it may be as large in proportion to its through traffic as on the other trunk lines, or larger.

In the year 1879-80 the gross earnings of the several trunk lines were:

Grand Trunk	$9,850,975
New York Central	30,318,946
Erie	18,693,109
Pennsylvania (year 1880)	40,840,642
Baltimore & Ohio	18,317,740

The Erie's earnings, it appears, were nearly the same as the Baltimore & Ohio's, and it has certainly twice as much through traffic; and though it has but 420 miles haul on this freight, while on a part of it the Baltimore & Ohio has 825 miles haul (on most of the rest of it only 380 miles), still the Erie's earnings must be much more affected than the Baltimore & Ohio's by low through rates. The New York Central, having more than three times as much through traffic and little more than one-half more earnings, must also feel more the effect of through rates; the Pennsylvania, having between two and three times as much through freight and little more than twice the earnings, should also feel it more, especially as its stock bears the losses and gains in freights west of the Ohio as well as east of it. The Grand Trunk, earning but half as much, and carrying not much less through freight, should also feel the low rates of a railroad war more than the Baltimore & Ohio.

Going back now to the table of earnings and expenses, we see that though the comparison with 1879–80 shows but a trifling gain in gross and a large loss in net earnings, a comparison with the previous year (which was much better than any before it) is very favorable indeed, so far as gross earnings are concerned. Let us make it:

	1880–81	1878–79	Increase.	P. c.
Gross earnings	$18,463,877	$14,193,981	$4,269,896	30.1
Expenses	11,390,479	7,691,596	3,698,883	48.1
Net earnings	$7,073,398	$6,605,385	$468,013	7.1

An increase of earnings of 30 per cent. in two years ought to be satisfactory; but doubtless it would be much more so had not the expenses increased *nearly one-half* in the same time. Still the increase in net earnings is nearly 3½ per cent. on the company's common stock. (But the increase in expenses was 25 per cent. on that stock.)

We showed last year that the chief part of the increase in expenses on the "Main Stem and Branches" over 1879 was due to maintenance and renewals. This year but a small part ($218,744 out of $1,059,709) of the increase is on these lines, and there are some large increases in maintenance expenses again—nearly 40 per cent. in road, 31 per cent. in bridges, buildings, etc., and 10 per cent. in passenger cars. But there was a slight decrease (4.8 per cent.) in the heavy item of locomotive maintenance, and an enormous one, amounting to $447,210 and 33 per cent., in the expenditure for repairs and renewals of freight cars, and this balances the greater part of the increases in other items of maintenance expenses. In this item of freight car maintenance was included the cost of 1,690 new cars in 1880 and of but 1,261 in 1881. There is an increase of 10½ per cent. in the "transportation" expenses, and of 5.4 per cent. in the cost of fuel.

The chief increase of expenses, however, was on the other lines, and for these only the total amount is given and not the different items. On the Washington Branch the expenses reported were more than doubled, but heretofore only a small proportion of the total expenses of this line have been charged to it. The increase on the Parkersburg Branch was 31 per cent., but there was not much increase on this line the year before, the renewals made so profusely on some of the other lines that year having been postponed till this year on that one. On the Central Ohio expenses increased 12.4 per cent. (20 per cent. the year before); on the Lake Erie Division 23.3 per cent. (42 per cent. the year before); on the Chicago Division 20½ per cent. (49 per cent. the year before); on the Pittsburgh & Connellsville Branch 12.2 per cent. (42 per cent. the year before); on the other two lines there was not much change, the Newark, Somerset & Straitsville showing a slight decrease from last year.

These large increases in expenses are in many respects more important than the charges in earnings. But the latter also deserve notice. Gross earnings were *less* by $107,620 (9.6 per cent.) on the Main Stem and Branches, by $148,002 (20.8 per cent.) on the Parkersburg Branch, and by $47,344 (21.1 per cent.) on the Newark, Somerset & Straitsville. They were *more* by $39,164 (12.4 per cent.) on the Washington Branch, by $2,459 (¼ per cent.) on the Central Ohio, by $52,570 (6.2 per cent.) on the Lake Erie Division, by $89,668 (5.8 per cent.) on the Chicago Division, by $3,177 (6.3 per cent.) on the Wheeling, Pittsburgh and Baltimore, and by $262,066 (11.7 per cent.) on the Pittsburgh Division. The greatest gain was on the latter, which profits greatly by the activity in the iron and coke industries; the greatest loss is on the Parkersburg Branch, whose traffic is chiefly through.

In net earnings there was an increase of 11 per cent. on the Pittsburgh Division, and decreases on all the other lines, amounting to 80½ per cent. on the Parkersburg Branch (whose expenses were nearly 90 per cent. of its receipts), and to 47 per cent. on the Lake Erie Division (which also has a very high proportion of expense—87½ per cent.), and 29½ per cent. on the Central Ohio.

The lack of information of passenger and tonnage mileage in the reports of this road we have often deplored. It does, however, make a report of certain items of traffic, chiefly through, which, continued from year to year, is very interesting. According to this statement the tons of through freight carried by it in both directions were 2,014,110, and 1.7 per cent., more than last year. Yet it chronicles a large decrease in the grain and live stock carried, and as grain is by far the largest item of what is commonly known as through freight, going east to Baltimore, and as this last year (with flour) amounted to but 723,000 tons, and the line stock and lumber to but 195,000 more, and as the road carried in the last calendar year less than 48,000 tons

of provisions, the only other large item of east-bound freight in the country, and a very considerable part of the grain is not through, we cannot make out more than a million of tons of east-bound freight; and the west-bound can hardly be more than one-fourth as large, unless the report counts as "through" freight some traffic not usually so regarded. The growth of the through traffic reported, though small last year, was enormous previously. The other very large item of freight reported is coal. The amounts of through freight (in both directions) and coal carried on the Main Stem, reported for eleven successive years, has been, in tons:

Year.	Through.	Coal.	Year.	Through.	Coal.
1871.....	435,207	.....	1877	1,047,645	1,069,426
1872.....	557,609	.....	1878.....	1,149,499	1,129,387
1873.....	640,265	2,019,718	1879... ..	1,425,629	1,213,212
1874.... ...	752,256	1,778,628	1880.....	1,980,397	1,831,890
1875.....	872,101	1,519,889	1881.....	2,014,110	1,756,087
1876.....	1,093,393	1,187,289			

There has been hardly any interruption to the growth of through traffic, which was nearly twice as great this year as in 1877, and more than three times as great as in 1873. The coal traffic, however, was larger in 1873 than it ever has been since. It declined rapidly from 1873 to 1877, but since has increased greatly, though last year there was a slight decrease. Coal is one of the most valuable items in the traffic of this road, and the largest single one. Besides the amount noted above, it carried nearly a quarter more for its own use on this line, and 1,980,102 tons on the Pittsburgh Division and 378,917 on the lines west of the Ohio. The coal of the Pittsburgh Division is largely coke, and most of it is carried but a short distance, to Pittsburgh.

THE SCIENTIFIC AMERICAN AND THE FONTAINE LOCOMOTIVE.

The *Scientific American* of Nov. 26 contains an editorial which is a reply to and criticism of the article on the "Fontaine Fallacy," published in these columns in the number of Nov. 4. In referring to this subject again we feel compelled to make some fresh excuses to the more intelligent portion of our readers for discussing an invention which to them must appear perfectly irrational. But an article referred to, from our versatile contemporary, not only gives countenance to a manifest scientific absurdity, but its attempted rebuke of the temerity of the *Railroad Gazette*, in showing the fallacy of the Fontaine theory, suggests some questions concerning the ethical principles whichshould govern a discussion of this kind, and which will be taken up after the attitude which that paper has assumed with reference to the theory of the Fontaine engine has been considered.

Regarding the latter it says: "We are concerned *not with Mr. Fontaine's theories,** actual or hypothetical, but with the practical performance of this engine; the *Scientific American* persists in having a higher respect for the results of Mr. Fontaine's alleged irrationality and unwisdom than for the critical acumen of the *Gazette*."

That is severe, and it is to be hoped that its "persistence in disrespect" will have an adequately humiliating effect on those who are responsible for what the *Railroad Gazette* publishes. If the "critical acumen" of the latter was the subject under dispute, or was one in the discussion of which the readers of either paper were likely to be interested, it might be worth while to show that it was not "injudicious" to expose the fallacy of the theory in which the Fontaine engine is said to work, and which was corroborated in a previous number of the *Scientific American;* but the perspicacity of the *Railroad Gazette* is not the question at issue, and its discussion is therefore respectively declined. What some of the readers of each journal are interested in knowing, however, is whether the theory on which the Fontaine engine has been said to work, and which produces "a reinforcement of power equal to nearly 80 per cent.," is correct or not. If it is, then Mr. Fontaine has made the most important invention and discovery that has ever been made in locomotive construction since Stephenson's time, and it would be temperate language to say that "there are millions in it;" yet with apparent confidence that the invention has such a value the *Scientific American* makes the astounding announcement that it is "not concerned in the theories" by which it is explained. It is difficult to understand what kind of subject should "concern" a "scientific" paper if not such theories.

It has been claimed for the Fontaine engine that "it has a theoretical advantage of nearly 80 per cent. in speed or traction above the best performance of engines of the same size built in the prevailing style—a practical gain of 30 per cent. is deemed well within the bounds of demonstration." What becomes of the trifle of 50 per cent. of difference between the "theoretical advantage" and the "practical gain," and which must be outside "the bounds of demonstration," does not appear.

The whole claim, we believe, is entirely groundless. As was distinctly stated in the article of Nov. 4, "if 7½ ft. driving-wheels are used, an engine will move, during one revolution of the crank, a distance exactly equal to that moved by the Fontaine gearing, with identical results." In other words, if wheels of equivalent size to the Fontaine gearing are employed with a locomotive of ordinary construction, exactly the same results may be accomplished, but in a much simpler way. This we tried to prove, but the only reply which the *Scientific American* makes to this proof is that "After the impossible has been accomplished, it usually turns out that the argument which established the supposed impossibility is found to be somewhere defective." Well, where is the defect? and if there is none, why is not the correspondent, whose letter is published in another page, right in his inference that the principle can be applied to velocipedes and other vehicles?

The test by which it is proposed to determine the value of the Fontaine locomotive is that of its "practical performance;" and to show what a "real engine" of this kind can do, it refers to a letter, which has somewhat the character of a report on the Fontaine engine, written last June by Mr. W. P. Taylor, General Manager of the Canada Southern Railway, to Mr. Wm. H. Vanderbilt. This letter contains the following statements of what the engine did while on that road:

1. With seven cars it ran a number of miles in 56½ seconds.

2. It handled heavy freight trains as easily as the larger Schenectady engines with 17x24 in. cylinders.

3. A test showed that the Fontaine engine made an *average of fifteen miles more* to a ton of coal than a Baldwin engine doing the same amount of work.

As theories do not concern our critic, they will be ignored, and attention will be given solely to "actual performances," as reported by Mr. Taylor, which are the only ones presented by our contemporary for the edification of its readers.

To the first it may be said that a speed of a mile in 56½ seconds, under the conditions named, is in no way remarkable. The Baldwin fast passenger engine, illustrated in the *Railroad Gazette* of May 7, 1880, with 6 ft. 6 in. driving-wheels (instead of 7 ft. 6 in., which it should have to correspond with the gearing of the Fontaine) ran on the Bound Brook line, during an experimental trip, with six cars, and at a time when it was not steaming well, 13.8 miles in 11 minutes, or at the rate of a mile in 47.8 seconds. This engine weighs 85,000 lbs. The Fontaine engine weighs 93,000 lbs.

Regarding the second statement, it may be said, that the Schenectady engines are not larger, in the sense of weighing more, than the Fontaine. The former weigh 70,000 lbs., or 23,000 lbs. less, and have very little, if any, more weight on four driving-wheels than the Fontaine has on two. The latter weight is 44,000 lbs., or 22,000 lbs. per wheel! That an engine weighing 93,000 lbs. should pull as much as one weighing only 70,000 does not indicate any very remarkable performance.

Regarding the last statement, it may well be asked whether the test was, as lawyers would say, *ex parte* or not. In other words, in making it had any one as much interest in the performance of the Baldwin engine as the inventor had in the Fontaine locomotive? A locomotive test with counsel for one side only is no more fair than a trial in a court of law would be if there was a lawyer for one side only—perhaps not so much so. Any one with the least experience in such matters knows the great amount of care and skill which must be exercised in making such experiments to get reliable results. To be at all comparable, such tests must be made under the same circumstances, with the engines in equally good condition and by an impartial person. It is as difficult for an inventor to be impartial at such a time as it would be for woman when the charms of her own baby are compared with those of some one else's child.

We do not mean either to underestimate the weight of Mr. Taylor's testimony in this case. It is, though, the only support for the opinions which the *Scientific American* has expressed. The latter has voluntarily kicked out all theory from under itself and rests its bold assertions on the testimony of Mr. Ortton and Mr. Taylor. The latter is the man placed in responsible charge of a great property. His report, assuming the average mileage of locomotives to be 36 miles to a ton of coal, would indicate a saving of very nearly 30 per cent. of the fuel used in locomotives. He has made this report to Mr. Vanderbilt, who directs the expenditure of a number of millions of dollars for fuel every year. If the economy indicated by the test could be realized by the use of Fontaine engines, Mr. Vanderbilt could make a saving of over a million dollars each year by using locomotives of that system. As we have said before, if engines of this kind can do what is claimed for them, the invention is of immense value; but if those who made the tests have deluded themselves and the *Scientific American*, then all that they have said indicates a want of that kind of knowledge which the positions they occupy would lead the public to expect them to have.

With reference to our discussion of the subject, the *Scientific American* says:

"It is obviously a little unfair, not to say injudicious and beside the question, to declare off-hand that the inventor 'seems to sincerely believe that he is able to get what in the West they call a twist on the action of mechanical forces, and that he gets more power out of the cylinders of his engine than ever goes into them.' It is worse than injudicious to add, as the *Gazette* does: 'Under this mistake he [the inventor] is spending his own money, which is unwise;' but what is worse is that the oldest and most widely circulated scientific paper in this country, by corroborating the erroneous theories which have been advanced concerning the engine, may induce other people to spend money on a device which the first and fundamental principles of mechanics should show to be irrational.'"

Now why is it "injudicious?" For some reason the idea seems to prevail that there is a kind of injustice in showing the error of any scheme of this kind which is brought before the public. A Detroit paper, in commenting on the article in these columns on the fallacy of this new theory called it "The attack of the *Railroad Gazette* on the Fontaine Engine," and suggests a dishonorable motive as the one which influenced the editor of this paper. The question comes up whether when an invention of this kind is presented to the public it is not a proper subject of criticism. It is to journals like this and the *Scientific American* that many persons look for information concerning such subjects. Silence even is often unjustifiable, and when the *Scientific American* suggests that it is worse than "injudicious" to show in these pages that they and others who have been the supporters and advocates of the Fontaine theory have been grievously mistaken, what does it mean? Is there some equivocal significance attached to the word "injudicious;" and if so, what is it?

The subject is not one, either, that should be lightly treated. A correspondent in another column, it is true, tries, by ridicule, to show the absurdity of the Fontaine principle. By using that weapon perhaps the fallacy of the whole theory may be made obvious to those who are not influenced by a scientific demonstration. But if vague report can be trusted, there are persons who by investing more money in the Fontaine scheme than they can afford to lose have been very injudicious indeed. A paper like the *Scientific American*, instead of misleading persons who are without scientific knowledge, should supply them with the kind of information which would protect them from the dangers of being without it.

Our criticism of this engine has not been as some journals have tried to make it appear, an attack on Mr. Fontaine or his interests. For him and his advocate, Mr. Ortton, we have a very high esteem, and our feeling is one of sincere regret that they have fallen into the error they have. If what they have claimed were true, no "attack" of the *Railroad Gazette* or any other paper could affect them. With a theoretical advantage of 80 per cent., or "practical gain of 30 per cent." even, they could jeer at any unfavorable criticism, and rejoice in the fact that all "attacks" only served to advertise this invention. It is because neither the theoretical advantage of 80 nor the practical gain of 30 per cent. exists that criticism hurts, and makes it appear like vindictiveness instead of the sober truth.

*The italics are ours.

THE NEW YORK, LAKE ERIE & WESTERN.

At the annual meeting of this company last Tuesday a short synopsis of the forthcoming annual report for the year ending with September last was submitted, which, with the help of previous reports, enables us to make the following comparisons:

First as to the traffic—the work done by the road. The number of passenger-miles and of ton-miles, and the mileage of passenger and freight trains, for nine successive years have been:

Year.	Passenger-miles.	Ton-miles.	Train-miles. Pass.	Train-miles. Freight.
1872-73.....	164,633,424	1,032,986,809	3,436,995	*10,260,465
1873-74.....	160,204,125	1,047,420,238	3,250,941	*9,883,760
1874-75.....	155,396,804	1,016,618,050	3,202,392	7,598,516
1875-76.....	163,074,795	1,040,431,921	3,201,005	7,507,842
1876-77.....	170,888,580	1,114,586,220	2,988,298	7,686,664
1877-78.....	140,326,749	1,224,763,718	3,032,717	7,687,514
1878-79.....	149,115 718	1,569,222,417	3,192,618	8,467,847
1879-80.....	180,460,204	1,721,112,095	3,280,456	8,171,901
1880-81.....	200,483,790	1,984,394,855	3,476,629	9,112,086

* Including switching and work-train mileage.

The growth of traffic since last year is very large, amounting to 11 per cent. in passengers and to no less

than 15.3 per cent. in freight. And this comes after the great gains of 1880, and the increase in *two* years is no less than 34.4 per cent. in passengers and 27 per cent. in freight. The stagnation of passenger traffic until recently was a condition which this road shared with most others, but it was different with freight. Its freight traffic was almost stationary, it will be seen, from 1873 to 1876, inclusive; but in that period the New York Central's traffic increased no less than 34 per cent., and most other roads made large gains. In 1873 the Central's traffic was 20 per cent. more than the Erie's; in 1876 it was 60 per cent. more. The Erie began to gain in 1877, at first slowly, but faster and faster year after year, until last year the *gain* over 1880 was equal to one-fourth of the whole traffic in 1876 and the years previous, and in successive years the gain, in millions of ton-miles, has been: 1877, 74; 1878, 110; 1879, 337; 1880, 159; 1881, 263.

Its gains in late years (down to 1880, which is as far as we have reports from the other roads) were greater than on the New York Central and nearly as great as on the Pennsylvania. From 1878 to 1880 the New York Central gained 482 millions of ton-miles, the Pennsylvania (main line and branches) 566, and the Erie 496. The percentage of increase was 40½ per cent. on the Erie, 32½ on the Pennsylvania and 23½ on the New York Central.

When the present management of the Erie urged on the proprietors the importance of providing capital to improve the road and equip it properly, it held forth two objects to be attained thereby: first, a material reduction in the expenses, and, second, the transportation of a larger amount of traffic than was then possible. The first of these objects it was plain to anyone familiar with the situation could certainly be attained, and of itself made the proposed improvements well nigh indispensable. The second did not seem so certain, but it has been attained in a degree which we at least find astonishing. Not but that the road, if prepared to receive it, was reasonably sure to get a share of the general increase in traffic that was sure to come; but that it was by no means so sure that it would get a larger proportion of it than its old and thoroughly equipped rivals. But this it did do in 1879 and 1880, we see; and we have little doubt that the vast increase in freight which it reports for 1881 will also be found larger than the gains of the New York Central and the Pennsylvania in those years—at least a larger percentage of its 1880 traffic.

The train mileage is put by the side of the traffic, in order to show how much less it has increased, and to explain one of the ways in which the expenses per ton per mile have been reduced. For the first three years the freight-train mileage is vitiated by including the switching and service mileage, which has usually been about 2,000,000 miles a year. But beginning with 1875, when we have the freight-train mileage by itself, we find the average freight-train load to have been 188.7 tons; while last year it was no less than 217.8 tons—the same as the New York Central's average in 1880.

Probably it would have been hard to convince any one a few years ago that the Erie ever could be made to haul as heavy average loads as the New York Central. That, indeed, had never been promised. But now we find it practically attained. It need not be assumed, however, that the *maximum* loaded trains on the Erie are as large as on the Central. The average is greatly affected by the balance between the freights in the two directions. Now the Erie has an enormous advantage in its great coal traffic, much of which goes to fill cars that would otherwise go west empty. The average train-load, it will be noticed, would make but a small train—filling only 11 of the 20-ton cars now in vogue. But in any event a large proportion of the cars are hauled empty one way, and this greatly reduces the average. Now this increase in train-loads has been wholly due to the improvements of the road and its new equipment, as, we might have said, the vast increase in its freight traffic is due largely to the immense addition to its stock of cars.

Apropos of the coal traffic, this is a feature of the Erie's business to which sufficient attention has not been given. For four years past the ton-miles of coal have been reported separately, and these and the ton-miles of other freight have been:

	1877-78.	1878-79.	1879-80.	1880-81.
Coal...	267,344,580	500,436,551	432,329,839	574,533,237
Other..	957,419,138	1,068,785,866	1,288,782,256	1,409,861,618
Total..	1,224,763,718	1,569,222,417	1,721,112,095	1,984,394,855

Thus of the great gain in freight traffic last year, more than half was coal, which increased 33 per cent., while the other freight increased but 9.4 per cent. Since 1878 the increase in coal traffic has been 115 per cent., in other freights, 47 per cent. This great gain in coal helps to explain how the Erie has gained in traffic comparatively more than the other trunk lines. The number of tons carried by it last year was 5,518,850, which is more than one-fifth of the whole anthracite production (it is not all anthracite, however). In 1880 only one of the anthracite coal roads, the Reading, carried as much. The Erie is thus one of the greatest coal carriers in the country, and in ton-miles of coal it very likely equals any of the anthracite roads.

The earnings from passengers and freight on this road and the average receipt and expense per passenger and per ton per mile (in cents) have been:

	Earnings.		Per pass-mile.		Per ton-mile.	
	Passenger.	Freight.	Rate.	Cost.	Rate.	Cost.
'72-73..	$3,651,554	$15,015,808	2.218	2.43	1.454	9.33
'73-74..	3,705,574	13,740,042	2 313	2.50	1.311	0.912
'74-75..	3,461,304	12,287,400	2.220	1.951	1.208	0.958
'75-76..	3,427,626	11,429,930	2.102	1.854	1.099	0.885
'76-77..	3,220,090	10,647,807	1.885	1.471	0.955	0.752
'77-78..	3,070,121	11,914,490	2.189	1.693	0.973	0.674
'78-79..	3,118,944	12,233,481	2.091	1.594	0.780	0.561
'79-80..	3,682,951	14,391,115	2.041	1.361	0.836	0.534
'80-81..	4,041,267	15,979,576	2.016	1.372	0.805	0.529

The passenger earnings, we see, increased 9.8 per cent., the increase in passenger traffic being 11 per cent.; and the freight earnings increased 11.1 per cent., with an increase of 15.3 per cent. in freight traffic. There was a reduction in the average rate on both passengers and freight, and an increase in the average cost per passenger-mile, but a slight decrease in the average cost per ton-mile. The average *profit* fell from 0.680 to 0.644 cent. per passenger-mile, and from 0.302 to 0.276 cent. per ton-mile. The decrease in the average freight profit, which was one-quarter of a mill, was equivalent to nearly half a million of dollars of net earnings.

Here again we have a separate statement of the coal earnings and rates to enable us to find where the loss in freight profits was. The increase of 33 per cent in coal traffic was in spite of an increase from 0.738 to 0.845 cent per ton per mile. This coal rate was considerably less than the average rate on other freight in 1880; in 1881 it was considerably more, as follows:

	Average rate.		
	Coal.	Other freight.	All freight.
1881.....	0.845	0.789	0.805
1880.....	0.738	0.869	0.836

Thus there was an increase of no less than $1,661,810, or 52 per cent., in the earnings from coal, while the coal traffic increased but 33 per cent. At the same time there was a *decrease* of $1,125,548, or 10 per cent., in the other freight earnings, although the other freight traffic increased 9.4 per cent. If we assume that the cost per ton per mile was the same for all freight (and it certainly should be less than the average for coal), then coal contributed $1,815,500 to the *net* earnings last year, against $880,000 the year before, and the other freight $3,665,600, against $4,317,500 the year before. That is, there was a decrease of $652,000 in the profits on general freight, notwithstanding a larger traffic and lower expenses, and an increase of $935,500 in the profits on coal. The latter is more than twice as great as the whole increase in net earnings, and it is evidently the good coal traffic and good coal rates that saved the road from a decrease in net earnings equal to the whole amount of the 6 per cent. dividend on the preferred stock just declared.

The gross earnings, expenses, net earnings and disposition of the same have been, for two years:

	1880-81.	1879-80.	Increase.	P. c.
Gross earn....	$20,715,605.18	$18,693,108.86	$2,022,496.32	10.9
Expenses.....	13,256,230.06	11,643,925.35	1,612,304.71	13.9
Net earn....	$7,459,375.12	$7,049,183.51	$410,192.61	5.8
Other income.	844,305.96	783,956.65	60,349.31	7.7
Total inc....	$8,303,681.08	$7,833,140.16	$470,540.92	6.0
Interest.....	4,148,745.50	3,963,872.69	184,872.81	4.7
Rentals, etc..	2,287,517.84	2,078,646.76	188,871.08	9.1
Total chg...	$6,416,263.34	$6,042,519.45	$373,743.89	6.2
Surplus.....	$1,887,417.74	$1,790,620.71	$96,797.03	5.4

The increase in expenses is very large, but only about in proportion to the increase in traffic, which latter, counting a passenger-mile as equal to two ton-miles, was 14½ per cent., while the increase in working expenses was 14 per cent. There was some increase in the rentals and fixed charges, so that the gain of $470,000 in income was reduced to $96,800 in the surplus, which is properly the income of the stockholders. It is not, therefore, because of the gain in surplus that the dividend on the preferred stock and the interest on the income bonds were declared. These were earned nearly three times over the year before, but the money was imperatively required for other purposes—for completing the improvements which have transformed this road within a few years from a most imperfect, imperfectly equipped and costly line to work, to one of the most effective and economical carriers in the country, with twice the traffic that it had five years ago.

OCTOBER EARNINGS.

October earnings are reported in our table by 55 railroads, which had 42,759 miles of road this year, or about three-sevenths of the total mileage now in operation in the United States. This was 5,377 miles, or 14.4 per cent., more than they were working at this time last year. With this mileage they earned $29,634,286, which is $2,332,693, or 8.5 per cent., more than they earned in the corresponding month of last year, and their average earnings per mile of road *decreased* from $730 to $693, or 5.1 per cent. Of the 55 roads, 18 show a decrease in total earnings, and 26 a decrease in earnings per mile. In the latter there are very few large gains, except by roads which had very light earnings last year, the most important, perhaps, being the gain of 29 per cent. on the St. Paul, Minneapolis & Manitoba, which, though mostly new and in a very new country, had nearly the average earnings per mile of all the roads in October. There are more large decreases—31 per cent. on the Central Iowa, 21 on the Denver & Rio Grande (in spite of which its earnings are astonishingly large, considering its vast new mileage built through the wilderness), 28 on the Lake Erie & Western, 23½ on the Terre Haute Main Line, and 28½ on the Wabash.

Among the roads reporting are eight which carry a considerable amount of through trunk-line traffic, and which therefore are considerably affected by the current low rates. Including the Wabash, a very large part of whose enormous system does not have much of this traffic, these lines have 6,952 miles of road this year, against 6,157 last year, and their aggregate earnings fell from $6,592,808 to $6,131,728, or 7 per cent., and their average earnings per mile from $1,071 to $882, or 17.7 per cent. Only two of these roads, and these new and the least important, show any increase. But decreases were not peculiar to them, by any means. Out of 20 Western roads reporting 14 showed a decrease in earnings per mile, and 7 out of 14 Southern roads.

The roads with the largest and smallest earnings per mile in October were:

Largest.	Per Mile.	Smallest.	Per mile.
Reading.....	$2,350	Toledo, Delphos & Buri..	$156
Pennsylvania	1,908	Houston, E. & W. Tex...	183
Northern Central....	1,379	Mem., Paducah & Nor..	217
Iron Mountain	1,050	Peoria, Dec. & Ev.....	239
Central Pacific...	906	Cleve., Mt. V. & Del.....	264
Union Pacific....	901	Mil., Lake Shore & W....	274
Chicago & Alton....	886	Cairo & St. Louis..... ..	278
Cin., Hamilton & D.....	794	Alabama Gt. So.	279

These include all that earned more than $800 or less than $300 per mile.

Below we give our usual table showing the earnings per mile of road, so far as they have been reported, of a large number of roads, for six successive years:

October Earnings per mile for Six Years.

	1876.	1877.	1878.	1879.	1880.	1881.
Ala. Gt. South.....	.....	.....	... ...	$159	$233	$279
Burl., C. R. & Nor.	$303	$411	$326	395	414	393
Cairo & St. Louis.	207	162	152	227	298	278
Central Pacific....	1,090	974	813	775	865	906
Central Iowa.....	.....	495	419	433	553	381
Chesapeake & O.	.....	.....	.....	421	487	537
Chicago & Alton..	820	657	718	795	935	886
Chic. & East Ill...	541	544	520	585	573	693
Chic., Mil. & St. P.	584	838	481	415	480	403
Chic. & N. W.....	775	702	740	828	816	784
Chic., St. P., Minn. & O.	.....	.....	428	428	415	378
Cin., Hamilton & D	654	663	631	784	785	794
Chic., Ind., St. L. & Chic.....	714	631	678	922	790	709
Cleve., Mt. V. & Del..... ...	233	239	243	271	224	264
Denver & Rio G ...	223	255	368	416	859	679
Des Moines & Ft. D	....	....	....	296	397	477
Det., Lan. & North.	....	....	....	561	555	572
E. Tenn., Va. & Ga.	440	....	339	....	337	351
Flint & Pere M...	....	....	....	441	499	528
Hanni. & St. Jo...	630	743	798	821	829	731
Ill. Cen., in Ill...	746	833	620	733	749	714
Ill. Cen., in Iowa .	452	508	368	452	477	434
Ind., Bloom. & West.....	404	347	508	570	490	452
Louisville & Nash.	563	562	469	551	544	544
Mem. & Charlest'n	368	363	....	226	431	410
Mem., Pad. & Nor.	148	150	82	115	205	217
Mo., Kan. & Tex..	379	392	438	470	485	496
Mobile & Ohio...	502	440	142	528	523	500
Nash., Chat. & St. L	421	494	393	374	382	360
N. Y. & New. Eng.	....	....	....	729	682	729
Norfolk & West ..	476	453	470	468	551	565
Northern Central.	1,416	1,433	1,279	1,269	1,570	1,379
Northern Pacific..	.....	.....	.....	458	496	582
Paducah & Eliz...	.....	185	165	296	219	303
Pennsylvania.....	2,389	1,802	1,800	1,879	2,066	1,908
Phila. & Reading..	1,734	1,665	1,507	1,666	2,064	2,350
St. L. & T. H., Main Line.....	....	.....	514	598	738	565
St. L. & T. H., Belleville Line..	718	877	797	898	644	568
St. L., I. Mt. & So.	640	746	853	1,058	1,005	1,050
St. L. & San Fran.	471	416	384	467	525	477
St. P., Minn. & Man.	...	...	...	485	526	678
Scioto Valley.....	...	134	290	302	302	375
Texas & Pacific...	456	584	546	691	552	448

The numbers of roads that have had earnings per mile in October larger in previous years than this year are: 22 out of 43 in 1880; 18 out of 42 in 1879; 8 out of 34 in 1878; 13 out of 32 in 1877, and 13 out of 30 in 1876.

Our tables for the several months of this year have shown the following percentages of increase and decrease in earnings per mile:

Jan.....	Decrease 7.0 per cent.	June.....	Increase 13.4 per cent.
Feb.....	" 10.0 "	July	" 4.8 "
Mar.....	" 6.1 "	Aug.	" 6.9 "
April	Increase 2.9 "	Sept.	Decrease 1.6 "
May.....	" 3.5 "	Oct.....	" 5.1 "

Last year there was an increase in every one of these months, and in most cases it was very much larger than this year. Last year there was also an increase of 4.4 per cent. in November, but a decrease of 2.4 per cent. in December. These months, therefore, will be more favorable than most months of 1880 to compare

with. For the ten months ending with October last year our table showed an increase of 11.3 per cent. in average earnings per mile. This year there is a decrease of 0.7 per cent.

The Corn Crop.

The corn crop, as finally reported by the Department of Agriculture, will amount to 1,275,000,000 bushels this year, against 1,717,000,000 last, the decrease being 442,000,000 bushels, or 26 per cent. This is truly a great falling off, and the more so because the crop of 1880 was not a first-rate one, but a little less than that of the year before. There has not been so small a production reported before since 1874, though the census indicated that all reported productions had been too small, and on the basis of the information in that year the estimate of 1880 was increased no less than 180,000,000. The decrease is four times as much as the largest exports of corn ever made from this country, and in number of bushels exceeds the whole crop of wheat this year.

The Department's estimate differs widely from some others which have been made apparently with care and pretty full information. For instance, Illinois is credited with a crop as large as last year's, while it has been reported to have one smaller by tens of millions of bushels. But it is the only one of the great corn states that is not reported to have a large decrease from last year. The yields of these states are given as fo llows:

	1881.	1880.	Inc. or Dec.	P. c.
Ohio	92,422,200	119,940,000	Dec. 27,517,800	23.0
Indiana	80,417,000	99,229,300	Dec. 18,812,300	19.0
Illinois	242,216,000	240,452,896	Inc. 1,763,104	7.3
Missouri	101,700,000	160,463,408	Dec. 58,763,408	36.7
Kansas	65,975,000	106,218,360	Dec. 40,243,360	38.0
Nebraska	52,800,000	59,507,600	Dec. 6,707,600	11.3
Iowa	175,967,900	260,192,840	Dec. 84,224,940	32.6
The seven states	811,498,100	1,046,004,404	Dec. 234,506,304	22.3

In the three states east of the Mississippi there are, according to this report, 415,055,200 bushels of corn this year against 459,622,196 last year, the decrease being only 44,600,000 bushels, less than 11 per cent.; while in the four states west of the Mississippi the production decreased from 586,382,208 bushels in 1880 to 396,442,900 in 1881—a falling-off of 189,939,308 bushels, or no less than 33⅓ per cent.

Although there is no doubt that in some parts of Illinois the crop is better this year than last, yet the statement that the total crop of the state is as large as last year is so opposed to nearly all other statistics collected, and to the known fact that in considerable parts of the state the crop is almost a total failure, that it is not easy to accept it. If true, the prospects for the year of not a few railroads in Illinois (chiefly those south of the line through Logansport, Peoria and Warsaw) are materially improved.

The decrease is largest in proportion in Missouri and Kansas, which have but about half an average yield per acre. In Iowa the large decrease of 84,000,000 bushels in spite of a very much larger area planted, due to the late spring's preventing the sowing of as much small grain as had been intended.

The states above named produce most of the corn exported, and also most of that shipped to the East and South for domestic consumption. The department includes Michigan, Wisconsin and Minnesota with them in its group of "Western States," producing this year 900,000,000 bushels, against 1,130,000,000 last year. The three northern states have unusually good crops of corn this year, and together increased their production from 84,000,000 last year, to 88,000,000 bushels; but this total, it will be seen, is but a trifle compared with the production of some of the states in the corn belt proper.

The Department's statement of production in groups of states is:

	1881.	1880.	Inc. or Dec.	P. c.
New England (6)	8,280,000	8,171,050	I. 108,950	13.3
Middle (4)	70,257,000	104,403,420	D. 34,146,420	32.7
Southern (14)	289,258,500	466,825,489	D. 177,566,989	38.5
Western (10)	899,858,700	1,130,065,837	D. 230,207,137	20.4
Pacific and territories	8,137,900	7,968,752	I. 169,148	2.1
Total	1,275,792,900	1,717,434,548	D. 441,641,648	25.7

Corn, it will be seen, is a very important crop in the South, although it usually imports part of its supply. Last year it produced 27 per cent. of the total crop of the United States, and nearly four times as much as the rest of the country outside of the 10 Western states. The value of this corn at 63 cents a bushel was equal to the whole cotton crop at 9 cents a pound. It suffers the greatest reduction in the crop, and this loss of 177,500,000 will be quite severely felt, the more so because in many cases it will compel the importation of supplies to replace it at very high prices.

The decrease has been large in most parts of the South. A large part of its production is usually in the three states between the Alleghenies and the Mississippi and Ohio. There production fell 37½ per cent., from 160,357,000 to 100,689,000 bushels. In the Department's grouping, Delaware and Maryland, which geographically, climatically and economically are Northern states, are classed with the Southern States. The six states on the Atlantic coast, from Delaware to Georgia, inclusive, show a decrease of one-third, amounting to 48,000,000 bushels; Virginia and North Carolina, the chief producers, losing 40 per cent. In the Gulf states east of the Mississippi the decrease is not so great; but west of the Mississippi there is a decrease of 5,500,000 bushels (37 per cent.) in Louisiana, 38,900,000 (58 per cent.) in Texas and 13,250,000 (41 per cent.) in Arkansas. Texas has suffered more in proportion than any other state, but its whole corn production, though larger last year than in any other Southern state except Kentucky, for a state of its population, not to say area, is small. In Iowa in 1880 the production of corn per inhabitant was 160 bushels, in Nebraska 132, in Kansas 107; while in Texas it was 42 bushels, in Arkansas 40, in Mississippi 20½, in Kentucky (which used to be the leading corn state, and in productions is still more a Northern than a Southern state), 49. We have purposely selected states which (except Kentucky) have no large cities, in order to compare only agricultural communities with each other.

The Southern railroads, however, may not lose much directly by a short crop of corn in the South; except from parts of Kentucky and Tennessee, not much corn is shipped from Southern stations; it is mostly consumed where grown, especially in the cotton states. If there is a short home supply, the Southern roads carry more corn from the North to the planters. Their loss from a short corn crop is by the smaller profits of the planters, which they feel very decidedly.

October Earnings of the Pennsylvania Railroad.

October earnings and expenses have been reported for all lines of the Pennsylvania Railroad east of Pittsburgh and Erie, by which it appears that compared with last year there was a *decrease* of $209,743, or 5.4 per cent. in the gross earnings of the month, an increase of $123,619, or 5.6 per cent., in the working expenses, and a *decrease* of $333,362, or 19.7 per cent., in the net earnings. The gross earnings for the month, which for five years in succession had been the month of largest earnings of the whole year, were smaller than in any previous month of this year except January and February, though not much smaller, and in considering the decrease from last year, we should remember that the October receipts then were the largest the road had had in any month since the Centennial year. Further, the expenses reported for last October were unusually large.

The gross and net earnings and working expenses of the road in October for nine successive years have been:

	Gross earnings.	Expenses.	Net earnings.
1873	$3,757,311	$2,132,285	$1,625,026
1874	3,482,587	2,040,548	1,442,039
1875	3,272,267	1,829,433	1,442,834
1876	4,004,429	1,821,278	2,183,151
1877	3,210,038	1,704,764	1,505,274
1878	3,215,418	1,655,871	1,559,547
1879	3,518,144	1,832,214	1,685,930
1880	3,882,715	2,194,321	1,688,394
1881	3,672,972	2,317,940	1,355,032

Here we see that though the receipts were 5.4 per cent. less than last year in October, still they were larger than in any previous October since 1876, and in all of these three years, 1877, 1878 and 1879, the through freight was large and profitable throughout the fall, while this year, though taking it in both directions it was probably as large as ever, it was carried at about half the rates of the past four years. That the decrease in earnings was not greater must have been due to a great increase in other traffic. The expenses, it will be seen, are larger than in any previous year, and considerably more than the average monthly expenses have been this year.

For the ten months ending with October, compared with last year, there is an increase in the gross earnings of these lines east of Pittsburgh and Erie amounting to $2,414,885, or 7.1 per cent., an increase of $1,778,744, or 8.9 per cent., in the working expenses, and an increase of $636,141, or 4.5 per cent., in net earnings. The net earnings have been decreasing ever since July, though October is the first month of the year that there has not been an increase in the gross earnings. For the seven months ending with July last the net earnings were $1,091,213, or 11.6 per cent. more than last year; in the three following months the net earnings were $455,072, or nearly 10 per cent., less than last year, about three-fourths of this decrease being in October.

For six successive years the gross and net earnings and working expenses of the road during the ten months ending with October have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1876	$30,343,263	$18,716,426	$11,626,837
1877	25,216,296	15,793,302	9,422,994
1878	26,035,337	15,189,777	10,845,560
1879	28,034,356	16,655,316	11,379,040
1880	34,137,327	20,022,630	14,114,697
1881	36,552,212	21,801,374	14,750,838

The gross earnings are not only 7 per cent. more than last year, but 30 per cent. more than in 1879, 40 per cent. more than in 1878, and 45 per cent. more than in 1875. In net earnings there is an increase of 4.5 per cent. over 1880, nearly 30 per cent. over 1879, 36 per cent. over 1878, and 56½ per cent. over 1877.

The gains over years previous to last year are enormous, but if the decrease in October is repeated in November and December, the net earnings of this year will not exceed the very large ones of 1880. This is quite possible. Local traffic was very heavy in these months last year, and through shipments eastward are likely to be smaller this year, whatever the rates may be, and at current rates they will not yield much more than half as much money.

Foreign Railroad Notes.

A year ago or more we gave an account of the constitution and duties of the "railroad councils" which it was proposed to introduce into Prussia. The measure was not carried through in Prussia, but a similar scheme was carried in Bavaria, and the first sessions of the new council were held Oct. 24 and 25 last. It will be interesting to see what its proceedings were. The programme included the following:

1. Changes in the time-table for the coming winter from that of last winter.

2. Reduction of rates on grain shipments shipped from Austria-Hungary and from Bavaria to Switzerland and the Rhine.

3. Giving commissions to agencies of the Bavarian State Railroads.

4. Introduction of a new tariff for carrying cattle.

5. Nomenclature of the iron manufactures in special tariffs II. and III. (This was introduced by the Standing Committee on Rates at the general convention of the German railroads.)

6. Rates on wool. (Introduced as above.)

7. Admittance of the article "seeds of all kinds" into the special tariff I. (Introduced as above.)

Very little was done as to the winter time-table. A "Councillor of State" wished to have the passenger service separated from the freight service, and to avoid night service as much as possible in internal traffic.

With regard to reducing grain rates, the general direction of the government railroads said that there had been a material reduction in the traffic of late years, and it thought that a reduction in the rates, such as would still leave them well above cost, would revive the traffic. It asked the indorsement of the council for a request of the Austro-Hungarian roads to reduce the rates on grain from Austria-Hungary to Switzerland and the Rhine (crossing Bavaria) from 1.42 to 1.12 cents per ton per mile (the latter equivalent to a rate of 53 cents per 100 lbs. from Chicago to New York). The council voted 17 to 8 in favor of this proposition so far as shipments to Switzerland were concerned, but by an unanimous vote postponed the proposition as to shipments to the Rhine, to allow further consideration.

As to agencies, it was resolved that it might not be possible to avoid appointing paid agents, but that it should be limited to cases of necessity, and the commissions to foreign agents be only for shipments across Bavaria and not sufficient to endanger the tariff rates.

Live stock, it was advised, should pay in proportion to the area of car floor required, and not, as heretofore, in proportion to the capacity of the car for carrying freight. Some farmers wanted to have the necessary attendants of the cattle carried without charge, but their proposal was voted down by a great majority. The attendant is charged 7.8 cents per mile. A reduction of one-third in the freight on stock cattle was voted.

The action of this Council is, we believe, only recommendatory. The authorities ask its advice, and then determine as seems best to them.

The Prussian state railroads are divided into systems or districts, each with a thousand miles or so, and managed by a council of railroad officers known as as a "railroad directory," which is something like the corps of general officers of one of our railroads. The directory has under it "operating bureaux," each of which usually works a single line or "division" of a long line, and it is itself under the direction of the Minister of Public Works and his special railroad department.

Recently (Oct. 29), the railroad directory which has its seat at Hanover held a railroad conference to which were invited the persons and organizations in the district interested in transportation, to prefer requests, make complaints, etc. There were many present, and the character of the conference may be judged from the bodies represented, which were: The Chambers of Commerce at Bielefeld, Bremen, Cassel, Dortmund, Frankfort-on-the-Main, Giessen, Göttingen, Hamburg, Hanau, Hanover, Harburg, Hildesheim, Lüneburg, Osnabrück, etc.; the Mining Society of the Dortmund mining district, the Rhenish and Westphalian Cotton Manufacturers' Society, the German Millers' Union, the German Leather Trade Union, the Berlin Beet-sugar Society, and a great number of agricultural societies.

Many questions regar ding classification and rates were discussed. The farmers, who have generally opposed all special tariffs, which were largely applied to imported grain, etc., have asked for one. They have had a short crop of straw, and they are using large quantities of a manufacture of peat for litter. A specially low rate on this was asked: but one of the producers of the material strangely enough opposed it. He said that the producers this year could not begin to supply the demand, and were able to exact all the consumers could afford to pay. If the freight on it should be reduced, the manufacturers could not produce any more, and would be able to get as much as before, getting the whole benefit of the reduction in rates, and they, he said, were doing well enough without that.

The one thing in which those present were united was in complaining of the insufficient rolling stock of the state railroads, resulting in frequent freight blockades. Minister Maybach was advised to give out liberal orders for more cars and engines as soon as possible.

The French government in 1879 bought a railroad from Lérouville to Sedan, and since that time it has built seven other local lines in the northeastern part of the country. The Minister of Public Works was authorized to have these lines worked in whatever way he might judge best for the interests of the country. Recently he has concluded a contract with one of the great companies, the Eastern, to work all these roads, which are within the territory occupied by its system. The contract is a peculiar one. It provides how traffic shall be sent, and the method of charging expenses, and then the state is credited with all the earnings and charged with all the expenses of its lines, the latter being limited to a certain amount per train mile. It may easily happen that the government will have to pay a balance for having its roads worked, but it is not uncommon for the expenses of French local lines to exceed their receipts.

The irregularity of railroad accidents is shown by French statistics, which show that on the roads of the six great

companies in the period from 1868 to 1877 there were 773 accidents, by which 218 persons were killed and 2,158 injured. In 1871 there were no less than 155 accidents causing death or injury; in 1873, *not one!* The latter result may be regarded as truly remarkable.

The locomotive and car works of Germany are at last full of orders. Recently the Saxon Engine Works received an order for 20 light locomotives from the North Spanish Railroad Company, for which it is to receive about 12 cents *per pound*. The Alta Italia Company has ordered 11 express locomotives of the Vulcan Works near Stettin; 17 freight engines of Henschel & Son, of Cassel, and four freight engines from Maffei, at Hirschau near Munich. The Prussian government has ordered 20 tank locomotives for the new Berlin City Railroad, of three different works, at prices varying from $6,830 to $7,570 each. The Magdeburg Directory has also ordered 10 tank locomotives.

The Bromberg Directory has ordered 50 six-wheeled freight cars, with brakes, costing $610 each, and 50 without brakes at $460. Second and third-class passenger cars were contracted at $1,972 each, third-class cars at $1,570, fourth-class at $1,300, baggage cars at $1,212 and covered freight cars (four-wheeled, no doubt) at $520. The orders for cars seem trifling.

The Italian Minister of the Interior has issued the following circular to the prefects of the departments:

"By circular of April 11 you were informed of the condition of the work for cutting the Isthmus of Panama, in order that you might give the news the greatest possible publicity in the interest of emigrants. According to news since received, the number of workmen who have emigrated to the Isthmus already exceeds the demand; they continue to arrive there, and it is also intended to employ 1,000 Chinamen. Under these circumstances the position of the emigrants becomes very serious; and as, moreover, there is bad news regarding the health of the workmen, in consequence of the prevalence of the yellow fever, I direct your attention to these facts, with the request that you will bring them to the knowledge of the public, in order that emigrants may be prevented from resorting to that place, where they will, at present at least, only expose themselves to many dangers, without prospect of gain."

Standard Coupling-Link and Pin.

During last winter a great deal of difficulty was experienced on many roads from the breaking of the couplings of freight trains, which is said to be one of the most prolific causes of accidents. This evil was so great that a meeting of the master car-builders of the New York Central and connecting roads was held in Buffalo last January, to devise some means for increasing the strength of the couplings of cars. A standard link and pin was proposed at that meeting, of which an engraving was given in our last number (from which this description was omitted accidentally), and the Secretary was requested to embody the proceedings of the meeting into the form of a circular, to be sent to managers and superintendents of the different railroads. The following is the circular, as prepared by him:

"*To Railroad Officers.*—Representations having been received from general managers and master car-builders, of the great trouble they have experienced from the breaking apart of freight trains, owing to the weakness of coupling-links and pins, a meeting of master car-builders from various connecting roads was called to discuss the question of strengthening the links and pins to withstand the strains due to the increased weight of trains. Accordingly a meeting was held at the Tift House, in Buffalo, on the 13th of January, 1881, when the following representatives of the different roads named were present:

"Leander Garey, New York Central & Hudson River; John Kirby, Lake Shore & Michigan Southern; Robert Miller, Michigan Central; William McWood, Grand Trunk; John Ortton, Canada Southern; John S. Lentz, Lehigh Valley; Henry Childs, Great Western; F. M. Wilder, New York, Lake Erie & Western; and H. D. Titus, Southern Central.

"Letters expressing regret at their inability to attend the meeting, but strongly sympathizing with its object, were received from H. B. Stone, Chicago, Burlington & Quincy Railroad; Wm. Campbell, Chicago & Northwestern; W. B. Snow, Illinois Central; and J. M. Foss, Central Vermont, and also from several gentlemen representing car and iron manufacturing interests.

"On motion of Mr. Garey John Kirby was elected Chairman of the meeting and John Ortton Secretary.

"The following resolutions were unanimously agreed to and ordered to be printed and sent to all general managers, superintendents, master car-builders and those having control of the ordering of links and pins, urging the adoption of the standards hereafter described, under the belief that by adopting them the parting of trains caused by weak and defective couplings will be effectually prevented.

"*Resolved*, That the measurement inside of link be 10 in. and 1¾ in. wide.

"That the section of iron forming the link shall be what is known as D shape, measuring 1⅝ in. vertical section and 1¼ in. horizontal section for the sides of link, the ends to be enlarged to 1½ in. horizontal section and gradually tapered into the sides.

"That the body of the pin be made 1⅛ in. diameter and 10 in. long from under the collar or shoulder to the point. The head of the pin to be so formed that an eye-hole be made through it for the purpose of securing it to the car by a chain.

"That the heads of all new draw-bars be made to suit the new link and pin, and that when old cars are taken into shops for repairs, the pin-holes of old draw-bars be reamed out, or made large enough to admit easily the new pin.

"That the quality of iron used for links and pins shall be such as will stand a tensile strain of not less than from 45,000 to 50,000 lbs. per square inch of section, and to have an elastic limit of not less than 30,000 lbs. per square inch, and to resist fracturing by slight hammering or concussions while under strain."

After this meeting had been held, it was thought by some of those who took part in it that possibly there might be difficulty in using the standard link with so many of the draw-bars in use, the mouths or openings in which have not depth or width enough to admit the new link. In other cases the pin-hole, it was feared, would be too far from the end, or face, of the draw-bar to permit it to be coupled with a link 10 in. long. Publication of the circular was therefore deferred until an investigation could be made concerning these points. Careful inquiry showed, however, that there is only a limited number of such draw-bars, which are of an obsolete pattern, still in use, and that they are gradually disappearing. It was, therefore, thought that the recommendation of the meeting referred to could be made public and acted upon.

That there is a great need of a standard coupling-link and pin which shall have greater strength than those now in use is obvious, and was very strongly emphasized by the experience of last winter, which it is quite certain neither railroad companies, officers nor employés care to have repeated during the coming cold weather.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Bodie Lumber Co.—This company's railroad is completed from Bodie, Cal., to Mono Mills, 31½ miles. Gauge, 3 ft.

California Southern.—Completed to a point 22 miles northward from San Diego, Cal., an extension of 8 miles.

Carson & Colorado.—Extended from Hawthorne, Nev., southeast 23 miles. Gauge, 3 ft.

Central, of Georgia.—The *Blakely Extension* has been extended from Arlington, Ga., southwest to Blakely, 14½ miles.

Chesapeake, Ohio & Southwestern.—Extended from Trimble, Tenn., south by west to Newbern, 6 miles.

Chicago & Northwestern.—The *Milwaukee & Madison Division* is completed by laying track from Waukesha, Wis., west 21 miles.

Danville, Olney & Ohio River.—Extended from Kansas, Ill., northwest to Sidell's Grove, 21 miles.

Elizabeth City & Norfolk.—Extended from Perquimans River, N. C., west by south to Edenton, 13 miles.

Genesee Valley.—Track laid from near Rochester, N. Y., southward 23 miles.

Massachuseetts Central.—Extended from Oakland, Mass., west to Jefferson, 5 miles.

New York, Chicago & St. Louis.—Extensions of track are reported as follows: West of Ashtabula, O., 15 miles; west of Painesville, O., 12; east of Fostoria, O., 14; between Fostoria and Ft. Wayne, 7; west of Hadley, Ind., 2; east of Argos, Ind., 25; east of Hobart, Ind., 8; in all, 83 miles.

New York, Texas & Mexican.—Track laid from Rosenberg Junction, Tex., south by west to East Bernard, 15 miles.

Ontonagon & Brule River.—The first track is laid from Ontonagon, Mich., eastward 8 miles.

Philadelphia & Chester County.—Track laid from the Philadelphia terminus west 2½ miles.

St. Paul, Minneapolis & Manitoba.—The *Grand Forks Branch* is extended from Ojata, Dak., westward to Larrimore, 30 miles.

Scotland Neck.—Track laid from Halifax, N. C., southeast to Conoconara Swamp, 9 miles.

Texas & Pacific.—Extended west to Cariso Pass, Tex., 20 miles.

This is a total of 333½ miles of new railroad, making 6,983 miles this year, against 5,443 miles reported at the corresponding time in 1880, 3,263 miles in 1879, 2,126 miles in 1878, 1,964 miles in 1877, 2,153 miles in 1876, 1,176 miles in 1875, 1,731 miles in 1874, 3,456 miles in 1873 and 6,559 miles in 1872.

STATISTICS OF RAILROAD ACCIDENTS have been published in the London *Times* recently, giving the numbers of the killed and injured by railroad accidents in three different countries down to and since 1859. According to this the number of passengers carried to every one killed and injured in the two periods has been:

	1835-59.		Since 1859.	
	—No. passengers to—		—No. passengers to—	
	1 killed.	1 injured.	1 killed.	1 injured.
France	1,955,555	496,551	13,323,014	673,927
England	5,256,290	311,345	15,229,073	407,260
Belgium	8,861,804	2,000,000	13,000,000	1,793,108

Like most comparisons in which English railroad statistics are concerned, nearly all value is taken from the above for the lack of a uniform measure of traffic. The "number of passengers" means the number of passenger journeys, and as these vary from less than half a mile to several hundred miles, they are an absurdly unfit standard for comparison. But the average passenger journey is doubtless shortest in the smallest countries—shorter in England than in France and much shorter in Belgium than in any other country. On this account, if the proportion of injured *to the whole amount of travel* was the same in these three countries, the *number of passengers* to one injured would be less in England than in Belgium, and less in France than in England. The best standard of comparison is the number of miles traveled by passengers, but this is not reported in Great Britain, which, so far as railroad statistics are concerned, is still in the dark ages.

The fallacy of comparing by the number of passengers carried becomes patent when we take different roads in the same country. In the state of New York, for instance, the Manhattan Railway Company, working the elevated railroads in New York city, 33 miles in all, the longest possible journey on which is but about 10 miles, *carried more passengers than all the other steam railroads of the state together*—60,800,000 out of a total of 108,000,000. It does not report passenger mileage—cannot very well—but the average journey on its roads was probably not more than three miles. It would take a larger one than that to make its passenger mileage 200,000,000. Now the New York Central in the same year carried but 8,271,000 passengers, but its passenger mileage was 330,800,000. How absurd to call the Manhattan the safer road if there should be one injury to 1,000,000 passengers on it and one to 500,000 on the New York Central, on which latter road the average journey is 40 miles instead of three! In England an enormous proportion of the passenger journeys is on the three London city roads, and another large proportion on suburban trains within 10 or 15 miles of London. To compare the safety of one of these journeys with that of a trip over the thousand miles of the Union Pacific is ridiculous. In the case of the two New York companies we find 4 passengers killed and 40 injured on the New York Central, and 4 killed and 28 injured on the Manhattan—the latter killing one out of 15,000,000 passengers, the former one out of 2,060,000; while the Manhattan killed one to 50,000,000 miles of traveling, the Central only one to 82,500,000.

A CENSUS OF THE RAILROADS was attempted for the last census, and a bulletin has been issued giving a brief summary of the traffic and fiscal operations of the New England roads. What other information may have been collected we do not know, but there is very little value in that given in the bulletin, which gives the totals for all the New England states of the sums invested in construction, equipment, etc., the numbers of locomotives and cars, the amount of capital stock, funded and floating debt, earnings, expenses, numbers of passengers and tons of freight carried, number of employés, etc. The figures do not differ greatly from those in the last Poor's Manual, except in the statement of floating debt, which is reported to be the enormous sum of $143,830,725, while the funded debt is but $108,996,207 and the capital stock $190,573,801. Poor gives the debts other than funded debt as $13,950,127, and the figures of the Census bulletin must be grossly erroneous, being at the rate of $24,420 per mile, and making the total amount of stock and debts $443,400,733, while the investments are reported to be $321,914,068.

All the information concerning traffic given in the bulletin is in the statements of the numbers of passengers and tons of freight carried—figures which by themselves are almost utterly valueless. The only figures not otherwise obtainable and of decided value are those giving the number of persons employed, which was 31,631—equal to 5.37 per mile of road and 18.25 per locomotive.

The special value of a census railroad report should be in giving statistics on the same basis for all roads, and all for the same year. But like most statistics, these reports have very little value unless they can be compared with something. We have had no census railroad statistics before, and if we had had, a comparison with the figures of 1870 would not have a great deal of value. However, this is the first of the bulletins, and when the others appear we can compare the New England roads with those of other groups of states. Further, the census has, we suppose, obtained reports from *all* the railroads, and there has always been a few which did not report at all in Poor's Manual, and many which neglected to report some facts of importance, so that the *totals* of the census will probably be much more accurate than any we have had heretofore. But the bulletins, which are the only parts of the census railroad reports, that the great mass of the public is ever likely to see (for they will be copied in many newspapers), should certainly include passenger-miles, ton-miles and train-miles—if perchance these statistics have been collected—and earnings from freight and passengers separately. Without these the reports will be rather more worthless than the British reports, which are probably the least valuable accurate railroad statistics in the world.

CHICAGO RAIL SHIPMENTS EASTWARD for the week ending Nov. 19 were 49,421 tons—the smallest since the low rates were made, and 2,528 tons less than the week before, although lake shipments practically ceased. Of the total shipments of the week 5.5 per cent. went by the Chicago & Grand Trunk, 26.8 by the Michigan Central, 26.8 by the Lake Shore, 23.7 by the Fort Wayne, 13.5 by the Panhandle, and 3.7 per cent. by the Baltimore & Ohio. The Grand Trunk and the Baltimore & Ohio carried 8.8 per cent. *less* than their allotted percentage (18 per cent.), and of this 4.6 per cent. went by the two Vanderbilt roads, and 4.2 by the two Pennsylvania roads. Rates are nominally 20 cents for grain and 25 for provisions by some of the lines and 5 cents higher by others, but actually they appear to be pretty much what the shipper chooses to pay, though the average rates are doubtless higher than they were a year ago.

The shipments in successive months from Chicago for three years past down to November, and the weekly shipments in November, so far as reported, have been:

	1879.	1880.	1881.
January	192,512	163,378	263,872
February	198,541	166,541	204,331
March	258,458	318,983	212,021
April	298,042	186,543	275,417
May	280,355	125,157	171,432
June	260,234	223,977	242,463
July	145,788	160,187	259,253
August	162,263	169,314	260,608
September	134,141	151,464	265,414
October	193,976	179,466	258,674
Week to			
Nov. 5	.....	45,013	53,229
" 12	.....	53,269	51,949
" 19	.....	53,096	49,421
" 26	.....	48,636	.....

Last year the weekly shipments were largest in March, but after that they were largest in November and December.

This year lake rates were not high in November, as they have been usually, and therefore there was no unusual pressure to ship by rail, though the railroads took a much larger propotion of the whole than usual when navigation is open. In no month but March have the shipments been smaller this year than last, but in the last two weeks for which we have reports they have been somewhat smaller.

For the week ending Nov. 26 the Chicago Board of Trade reports the shipments billed at Chicago to have been 35,624 tons, of which 3,945 were flour, 20,900 grain, and 10,784 provisions; this is a decrease of about 6,000 tons from the shipments reported the previous week. The Chicago & Grand Trunk had 5.6 per cent. of the total, the Michigan Central 27.1, the Lake Shore 31.8, the Fort Wayne 17.2, the Pan-handle 15.4 and the Baltimore & Ohio 2.9 per cent.

A GOOD USE FOR OLD (OR NEW) REPORTS, PAMPHLETS, ETC., is suggested by the Board of Direction of the American Society of Civil Engineers, which has issued a request to persons having books, reports, pamphlets, etc., relating to engineering matters, which they are disposed to contribute to the library of that Society, to forward them to its Secretary. It happens to most men who have been actively engaged, either professionally or otherwise, in engineering operations that they collect a great quantity of fugitive literature, which in time has become of little or no value to them and only cumbers their book shelves or garrets. Such persons may easily and usefully dispose of such material by forwarding it to the Secretary of this Society at No. 127 East Twenty-third street, New York. The Board of Directors in their circular say:

"We already have a large collection of railroad, city, canal, water-works and other reports, which form one of the most valuable features of the library, and we desire to make it more complete by preserving as full a history as possible of the progress of our public works.

"We also desire copies of testimony taken in patent cases; controversies concerning bridges, railroad crossings, reports of committees of investigation and of legislative commissions, etc., etc.

"We also desire a copy of all new reports issued by your company.

"All contributions will be duly acknowledged in the *Transactions* of the Society."

It will be a good plan if the officers of railroads put the name and other address of the Society on their list, and forward to it all reports issued by their companies.

THE DIFFERENCES IN RATES TO SEABOARD CITIES have already been modified several times, and always in favor of New York. Soon after the war an informal agreement was made by which the charge to Philadelphia and Baltimore was to be 10 cents lower per 100 lbs. than to New York. About 1870 the difference was reduced from 10 to 5 cents, and rates were made on this basis until near the end of 1875, when it was agreed that the difference should be, not a fixed sum, but a given percentage of the whole rate, and more to Baltimore than to Philadelphia—13 per cent. and 10 per cent. of the New York rate, respectively. We believe that one tariff was published with these differences, but four months from the time they were agreed upon broke out the great railroad war of 1876, lasting nearly the whole year, and ending with the agreement that the differences on east-bound freight should be fixed and amount to 3 cents per 100 lbs. to Baltimore and 2 to Philadelphia less than to New York. It is these differences which the New York Central now proposes to have abolished or reduced. It will be seen that there is no great room for reduction, but grain merchants agree that a very small amount is sufficient to divert shipments from one port to another.

Railroad Accidents in France.

The French railroads are subjected to an amount of government regulation and inspection practiced nowhere else probably where the railroads are not government property, but the complaints against the management of the roads are nevertheless very much like what they are in this country and England. There has been recently an unusual number of accidents on the Paris, Lyons & Mediterranean Company's lines, and the widely-circulated Paris *Figaro* has published a list of railroad directors, with a statement of the reputed wealth of each (most are millionaires) as evidence that they have been too anxious to accumulate wealth, and not anxious enough to provide for the safety of their roads. A writer commenting on the subject says:

"The French, who have the reputation of being the most enlightened of people, are certainly the most patient. Easily and profoundly excited on political questions, we submit humbly to all the misery and discomfort inflicted by the insufferable tyranny of this system of monopoly which has been growing in France for some years, and which is certainly most incompatible with the republican institutions of to-day. Steam and electricity, which ought to be the most powerful agents of the progress, security and comfort of the people, in the hands of those who direct their use become cause of almost all the accidents and delays which occur too often on all the railroads or telegraphs placed by law under the exclusive supervision of the government.

"It will not do, in order to justify the carelessness of some of the French railroad companies, to enlarge upon the catastrophes that occur in foreign countries, and especially in England and the United States. Statistics just published show that the number of killed and injured is comparatively much smaller in them than in France. The sensation stories published about the countless accidents occurring in the United States are entirely erroneous.

"Only a few days ago a great noise was made about an accident that happened on one of the Mexican railroads. Not only was the accident exaggerated, but it was wrongly attributed to the United States. The time of the old legends is past. In France we sometimes still find people who believe that a loaf of bread costs a dollar in California. That indeed was the price that the pioneers of that rich state paid when there was no one but monks and Indians there, and not a grain of wheat had been sown there. Forty years ago it took several months to go from New York to San Francisco, and it was then that a loaf of bread cost a dollar. Now the American continent is crossed in less than a week. The passengers are carried by the railroad companies in sumptuous cars, veritable traveling palaces, in which is found all the comfort of the best hotels in the world.

"As to the safety of the passengers, it is much greater than that which they find on the railroads of Europe, and especially on those of France, which have so sad a reputation in the United States.

"The people of the latter country would not tolerate for a week the carelessness and negligence which mark most of the arch-millionaire directors of the French railroad companies.

"If these people, spoiled by fortune, grow fat and strut every day at the head of these ill-starred lines, there is but one means of making them feel the terrible responsibility that weighs upon them. We must apply the remedy mentioned one day by M. Gambetta under other circumstances: 'Strike at their purses.'"

This will serve very well for a leader in some American paper, with slight changes of names. We fear that we would not come out very proudly from a comparison of French and American railroad accidents, and we imagine that we shall have to depend upon the remedy above recommended for the French roads. At least, if government inspection and regulation have failed to prevent accident in France, where the state commands a most thoroughly trained technical corps, including many experts in railroad construction and operation, we cannot expect much from

RAILROAD EARNINGS IN OCTOBER.

NAME OF ROAD.	MILEAGE. 1881.	1880.	Inc.	Dec	P. c	EARNINGS. 1881.	1880.	Increase.	Dec.	P. c.	EARNINGS PER MILE. 1881.	1880.	Inc.	Dec.	P. c.
Ala. Gt. Southern	290	290	.....	.....	.....	$ 80,869	$ 67,649	$ 13,220	$	19.4	$ 279	$ 233	$ 46	$	19.4
Bur., Cedar Rap. & No.	564	492	72	.....	14.6	221,748	204,990	16,758	.....	8.2	393	414	.....	21	5.0
Cairo & St. Louis	146	146	.....	.....	.....	40,587	43,544	.....	2,957	6.7	278	298	.....	20	6.7
Central Pacific	2,775	2,450	325	.....	13.3	2,514,000	2,120,229	393,771	.....	19.0	906	865	41	.....	4.7
Central Iowa	207	191	16	.....	8.4	87,913	105,735	.....	17,822	16.8	381	553	.....	172	31.1
Chesapeake & Ohio	442	435	7	.....	1.6	237,503	211,820	25,683	.....	12.0	537	487	50	.....	10.3
Chi & Alton	847	840	7	.....	0.8	750,359	785,199	.....	34,840	4.4	886	935	.....	49	5.5
Chi. & Eastern Ill	232	220	12	.....	5.5	160,743	126,022	34,721	.....	27.6	693	573	120	.....	20.8
Chicago & Gd. T	335	335	.....	.....	.....	151,233	139,826	11,407	.....	8.2	451	417	34	.....	8.2
Chi., Mil. & St. Paul	3,950	3,111	839	.....	27.1	1,590,000	1,493,620	96,380	.....	6.5	403	480	.....	77	17.5
Chi. & Northwestern	2,940	2,580	360	.....	13.9	2,305,700	2,107,217	200,483	.....	9.5	784	816	.....	32	3.9
Chi., St. P., Minn. & O.	980	824	156	.....	18.9	370,526	342,052	28,474	.....	8.3	378	415	.....	37	8.9
Cin., Ham. & Dayton	345	345	.....	.....	.....	274,030	270,686	3,344	.....	1.2	794	785	9	.....	1.2
Cin., Ind., St. L. & Chi.	300	300	.....	.....	.....	212,606	239,881	.....	27,275	11.4	709	799	.....	90	11.4
Cleve., Mt. Ver. & Del.	144	157	.....	13	8.3	37,996	35,211	2,785	.....	7.9	264	224	40	.....	17.8
Col., Hock'g V. & Tol.	320	320	.....	.....	.....	243,063	201,296	41,772	.....	20.8	760	629	131	.....	20.8
Denver & Rio Grande	980	551	429	.....	77.1	665,686	473,318	192,368	.....	40.6	679	859	.....	180	31.0
Des Moines & Ft. Dodge	84	84	.....	.....	.....	40,080	33,323	6,737	.....	20.2	477	397	80	.....	20.2
Det., Lansing & No	226	210	16	.....	7.6	129,369	116,602	12,767	.....	10.9	572	555	17	.....	3.1
East Tenn., Va. & Ga	900	900	.....	.....	.....	315,644	303,518	12,126	.....	4.0	351	337	14	.....	4.0
Flint & Pere Marq.	318	318	.....	.....	.....	168,038	158,753	9,305	.....	5.9	528	498	29	.....	5.9
Gulf, Col. & Santa F.	320	188	132	.....	70.2	127,421	73,508	53,853	.....	72.8	398	391	7	.....	1.6
Hannibal & St. Jo.	292	292	.....	.....	.....	213,433	242,214	.....	28,781	11.9	731	829	.....	96	11.9
Houston, E. & W. Tex.	103	72	31	.....	43.0	18,861	8,555	10,306	.....	119.8	183	119	64	.....	53.8
Ill. Cent., Ill. lines	918	918	.....	.....	.....	655,867	688,110	.....	32,243	4.7	714	749	.....	35	4.7
Iowa lines	402	402	.....	.....	.....	174,458	192,101	.....	17,643	9.7	434	477	.....	43	7.9
Ind., Bloom. & West.	402	402	.....	.....	.....	181,674	196,916	.....	15,242	7.7	452	490	.....	38	7.7
Ind., Dec. & Springf.	153	153	.....	.....	.....	47,005	44,424	2,581	.....	5.8	307	290	17	.....	5.8
Lake Erie & West	386	386	.....	.....	.....	122,732	170,936	.....	48,194	28.2	317	443	.....	128	28.2
Louisville & Nashv.	1,837	1,840	.....	3	0.2	1,009,100	1,000,326	8,774	.....	0.9	544	544	.....	.....	.....
Memphis & Charleston	292	292	.....	.....	.....	119,776	125,731	.....	5,955	4.7	410	431	.....	21	4.7
Memphis, Pad. & No	115	115	.....	.....	.....	24,967	23,545	1,422	.....	6.0	217	205	12	.....	6.0
Mil., Lake Sh. & West.	261	235	26	.....	11.0	71,395	40,124	31,271	.....	78.1	274	171	103	.....	60.2
Mo., Kan. & Tex.	1,702	1,408	294	.....	20.9	844,254	683,383	160,871	.....	23.5	496	485	11	.....	2.1
Mo. Pacific	1,150	950	200	.....	21.1	693,730	606,028	87,702	.....	14.5	603	638	.....	35	5.5
Mobile & Ohio	506	506	.....	.....	.....	252,921	264,713	.....	11,792	4.5	500	523	.....	23	4.5
Nash., Chatta. & St. L.	467	467	.....	.....	.....	172,124	178,266	.....	6,145	3.4	369	382	.....	13	3.1
N. Y. & New England	356	316	40	.....	12.7	250,522	215,491	44,031	.....	20.5	729	682	47	.....	6.8
Norfolk & Western	428	428	.....	.....	.....	241,073	235,910	5,763	.....	2.4	565	551	14	.....	2.4
Northern Central	326	326	.....	.....	.....	449,664	512,918	.....	63,254	12.3	1,379	1,570	.....	191	12.3
Northern Pacific	972	722	250	.....	34.7	565,485	358,456	207,029	.....	58.0	582	496	86	.....	17.1
Paducah & E'town	185	185	.....	.....	.....	56,081	40,494	15,587	.....	38.9	303	219	84	.....	38.9
Pennsylvania	1,925	1,880	45	.....	2.4	3,672,971	3,882,714	.....	209,743	5.4	1,908	2,066	.....	158	7.5
Peoria, Dec. & Evans.	248	190	58	.....	30.5	59,233	48,298	10,935	.....	22.8	239	254	.....	15	5.8
Phila. & Reading	846	846	.....	.....	.....	1,989,948	1,746,298	243,650	.....	14.0	2,350	2,064	286	.....	14.0
St. L., Alt. & T. H., Main Line	195	195	.....	.....	.....	110,149	143,881	.....	33,732	23.4	565	738	.....	173	23.4
Belleville Line	121	121	.....	.....	.....	68,780	77,982	.....	9,202	11.8	568	644	.....	76	11.8
St. L., Iron Mt. & So.	685	685	.....	.....	.....	719,239	688,365	30,874	.....	4.5	1,050	1,005	45	.....	4.5
St. L. & San Francisco	645	592	53	.....	9.0	308,569	310,581	.....	2,012	0.6	478	525	.....	47	8.9
St. P., Minn. & Manitoba	893	656	237	.....	36.1	695,708	345,056	230,652	.....	79.5	678	526	152	.....	28.8
Scioto Valley	128	100	28	.....	28.0	47,976	30,172	17,804	.....	59.3	375	302	73	.....	24.1
Texas & Pacific	900	550	350	.....	63.6	403,570	303,666	99,904	.....	32.9	448	552	.....	104	18.8
Tol., Delphos & Burl.	395	285	110	.....	38.6	62,475	34,827	27,648	.....	79.0	158	122	36	.....	29.5
Union Pacific	3,650	3,100	550	.....	18.1	3,289,530	2,707,860	581,670	.....	21.5	901	873	28	.....	3.2
Wabash, St. L. & P.	3,230	2,480	750	.....	30.2	1,396,300	1,501,203	.....	104,903	6.9	432	605	.....	173	28.8
Total, 55 roads	42,759	37,382	5,393	16	.....	29,634,286	27,301,593	3,004,428	671,735	.....	693	730	.....	.....	.....
Total inc. or dec.	.....	.....	5,377	.....	14.4	.....	.....	2,332,693	.....	8.5	.....	.....	.....	37	5.1

RAILROAD EARNINGS, NINE MONTHS ENDING OCTOBER 31.

NAME OF ROAD.	MILEAGE. 1881.	1880.	Inc.	Dec	P.c.	EARNINGS. 1881.	1880.	Increase.	De-crease.	P. c.	EARNINGS PER MILE. 1881.	1880.	Inc.	Dec.	P. c.
Ala. Gt. Southern	290	290	.....	.....	.....	$ 622,264	$ 521,906	$ 100,458	$	19.2	$ 2,146	$ 1,800	$ 346	$	19.2
Bur., Ced. Rap. & No.	564	492	72	.....	14.6	1,824,045	1,670,735	153,310	.....	9.2	3,234	3,396	.....	162	4.8
Cairo & St. Louis	146	146	.....	.....	.....	346,407	336,603	9,804	.....	2.9	2,373	2,306	67	.....	2.9
Central Pacific	2,715	2,393	322	.....	13.4	19,684,790	16,403,424	3,281,366	.....	20.0	7,250	6,855	395	.....	5.8
Chesapeake & Ohio	436	435	1	.....	0.2	2,268,722	2,215,545	53,217	.....	2.5	5,203	5,093	110	.....	2.2
Chicago & Alton	842	840	2	.....	0.2	6,211,169	6,446,727	.....	235,558	3.6	7,377	7,675	.....	298	3.8
Chi., Mil. & St. Paul	3,827	2,710	1,117	.....	41.4	13,602,000	10,216,767	3,385,233	.....	33.0	3,554	3,770	.....	216	5.7
Chi. & Northwestern	2,817	2,398	419	.....	17.5	17,939,297	16,082,485	1,856,812	.....	11.4	6,368	6,707	.....	339	5.1
Chi., St. Paul, Minn. & O	958	756	202	.....	26.8	3,169,733	2,467,630	702,703	.....	28.4	3,309	2,563	46	.....	1.4
Cin., Ind., St. L. & Chi.	300	300	.....	.....	.....	1,909,488	2,004,917	.....	95,429	4.7	6,365	6,683	.....	318	4.7
Cleve., Mt. V. & Del.	144	157	.....	13	8.3	348,127	358,353	.....	10,226	2.9	2,418	2,282	136	.....	5.5
Denver & R. G	755	438	317	.....	72.4	5,026,663	2,709,798	2,316,865	.....	85.8	6,658	6,186	472	.....	7.6
Des Moines & Ft. D'ge	84	84	.....	.....	.....	330,588	257,649	72,539	.....	28.4	3,936	3,060	870	.....	28.4
East Tenn., Va. & Ga	553	536	.....	.....	.....	2,042,617	1,850,948	191,669	.....	10.3	3,674	3,329	345	.....	10.3
Flint & Pere Mar.	318	305	13	.....	4.3	1,522,984	1,291,878	231,106	.....	17.8	4,793	4,236	557	.....	13.4
Great Western	526	526	.....	.....	.....	4,306,118	4,203,996	102,122	.....	2.4	8,186	7,992	194	.....	2.4
Hannibal & St. Jo.	292	292	.....	.....	.....	1,836,272	2,074,609	.....	238,337	11.5	6,289	7,105	.....	816	11.5
Houston, E. & W. Tex	92	72	20	.....	27.8	125,400	81,741	43,659	.....	53.2	1,363	1,135	228	.....	20.1
Ill. Cen., Ill. lines	918	900	18	.....	2.0	5,561,264	5,390,275	161,989	.....	3.0	6,058	5,999	59	.....	0.9
Iowa lines	402	402	.....	.....	.....	1,524,289	1,448,658	75,631	.....	5.2	3,792	3,604	188	.....	5.2
Ind., Bloom. & West.	288	288	.....	.....	.....	1,318,723	1,321,924	.....	3,201	0.2	4,579	4,590	.....	11	0.2
Ind., Dec. & Springf.	153	146	7	.....	4.8	425,386	352,645	72,741	.....	20.6	2,780	2,415	365	.....	15.1
Lake Erie & Western	388	354	32	.....	9.1	1,153,584	981,916	171,668	.....	17.5	2,989	2,774	215	.....	7.8
Louisville & Nash.	1,845	1,517	328	.....	21.8	9,153,451	7,589,075	1,564,376	.....	20.6	4,966	5,003	.....	37	0.7
Mem. & Charleston	292	292	.....	.....	.....	963,204	871,727	91,537	.....	10.5	3,300	2,984	316	.....	10.5
Mem., Pad. & No.	115	115	.....	.....	.....	198,313	172,886	25,427	.....	14.7	1,724	1,503	221	.....	14.7
Mil., Lake Sh. & West	251	214	37	.....	17.2	485,985	324,077	161,908	.....	49.9	1,936	1,514	422	.....	28.0
Mo., Kan & Texas	1,610	1,320	290	.....	22.0	6,415,767	4,879,995	1,535,773	.....	31.4	3,985	3,697	288	.....	7.8
Mo. Pacific	1,050	900	150	.....	16.7	5,159,360	4,455,294	704,065	.....	15.8	4,914	4,950	.....	36	0.7
Mobile & Ohio	506	506	.....	.....	.....	1,874,764	1,734,881	139,883	.....	8.1	3,705	3,428	277	.....	8.1
Nash., Chatta. & St. L.	467	455	12	.....	2.6	1,750,070	1,691,340	58,730	.....	3.5	3,747	3,717	30	.....	0.8
Norfolk & Western	428	428	.....	.....	.....	1,826,550	1,673,402	153,148	.....	9.1	4,268	3,910	358	.....	9.1
Northern Central	326	326	.....	.....	.....	4,470,917	4,097,023	382 894	.....	9.3	13,742	12,568	1,174	.....	9.3
Northern Pacific	797	689	108	.....	16.5	3,107,172	2,088,158	1,019,014	.....	48.3	3,899	3,031	868	.....	28.5
Pad. & E'town	185	185	.....	.....	.....	442,390	327,993	114,397	.....	34.9	2,391	1,773	618	.....	34.9
Pennsylvania	1,912	1,875	37	.....	2.0	36,552,212	34,137,327	2,414,885	.....	7.7	19,128	18,207	921	.....	5.1
Peo., Dec. & Evansv.	235	178	57	.....	31.6	563,446	354,753	214,693	.....	60.5	2,423	1,993	430	.....	21.6
St. L., A. & T. H., M. Li'e	195	195	.....	.....	.....	1,184,633	1,199,013	.....	14,380	1.2	6,075	6,149	.....	74	1.2
Belleville Line	121	91	30	.....	33.0	611,772	574,448	37,324	.....	6.5	5,056	6,313	.....	1,257	19.9
St. L., Iron Mt. & So.	685	685	.....	.....	.....	5,922,966	4,976,594	946,372	.....	19.0	8,647	7,265	1,382	.....	19.0
St. Louis & San Fran.	638	555	83	.....	14.9	2,588,010	2,186,635	401,375	.....	18.4	4,056	3,940	116	.....	2.9
St. P., Minn. & Man	869	656	213	.....	32.5	3,842,091	2,561,919	1,280,172	.....	50.0	4,421	3,905	516	.....	13.2
Scioto Valley	115	100	15	.....	15.0	352,886	263,512	89,374	.....	33.9	3,069	2,635	434	.....	16.7
Texas & Pacific	758	484	274	.....	56.6	3,063,623	2,140,367	923,256	.....	43.1	4,042	4,422	.....	380	8.6
Union Pacific	3,491	3,033	458	.....	15.0	22,411,219	19,327,562	3,083,657	.....	16.0	6,420	6,372	48	.....	0.8
Wab., St. L. & Pacific.	2,594	1,994	600	.....	30.1	11,788,181	10,247,170	1,541,011	.....	15.0	4,544	5,139	.....	595	11.7
Total, 46 roads	37,204	32,073	5,234	13	.....	217,844,132	188,574,100	29,867,163	597,131	.....	5,841	5,880	.....	.....	.....
Total increase or decrease	.....	.....	5,221	.....	16 3	.....	.....	29,270,032	.....	15.5	.....	.....	.....	39	0.7

them here; though we might doubtless gain considerably from a government *investigation* and full reports of accidents. The most effective means of preventing accidents is to make them very costly.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Oregon Railway & Navigation Co., special meeting, at the office in Portland, Or., Dec. 20.

New York & New England, annual meeting, at the office in Boston, Dec. 6.

Toledo, Delphos & Burlington, special meeting, in Toledo, O., Dec. 20, to vote on an agreement of consolidation with the Toledo, Cincinnati & St. Louis Company.

Santa Fe Canal Co., annual meeting, in Waldo, Fla., Dec. 12.

Mobile & Ohio, annual meeting, at the office in Mobile, Ala., Dec. 7.

Richmond & Allegheny, annual meeting, at the office in Richmond, Va., Dec. 13, at noon.

Railroad Conventions.

The *Railway Conductors' Life Insurance Association of the United States and Canada* will hold its annual meeting at the St. Charles Hotel, in New Orleans, beginning at 10 a. m. on Dec. 7. The meeting will last probably two days.

Dividends.

Dividends have been declared as follows:

Chicago, Burlington & Quincy, 2 per cent., quarterly, payable Dec. 15.

Eastern in New Hampshire (leased to Eastern Company), 2¼ per cent., semi-annual, payable Dec. 1.

Eel River (leased to Wabash, St. Louis & Pacific), 1 per cent., quarterly, payable Dec. 5.

Iowa Falls & Sioux City (leased to Illinois Central), 1½ per cent., quarterly, payable Dec. 1.

New York, Lake Erie & Western, 6 per cent. on the preferred stock from the earnings of the last year, payable Jan. 16.

Car-builders' Monthly Meeting.

The December meeting will be held Thursday evening, Dec. 15, at half-past seven o'clock, at the rooms, No. 113 Liberty street, New York. The subject for discussion will be car wheels, especially with reference to their proper gauge. It is expected that besides car-builders there will be many manufacturers of wheels present.

Wisconsin General Freight Agents' Association.

Pursuant to a call the General Freight Agents' Association of Wisconsin met at the Plankinton House, Milwaukee, Nov. 22, with T. H. Malone presiding. The following gentlemen were present: C. C. Eddy, Chicago & Northwestern; T. H. Malone, Wisconsin Central; D. W. Keyes, Chicago, Milwaukee & St. Paul; J. H. Hiland, St. Paul, Minneapolis & Omaha; H. F. Whitcomb, Milwaukee, Lake Shore & Western; Louis Blankenhorn, Chicago, Milwaukee & St. Paul; E. C. Case, Green Bay, Winona & St. Paul. Mr. Louis Blankenhorn acted as Secretary. A constitution was reported and adopted. Messrs. Malone, McCormick and Whitcomb were elected a committee on revised classification. Some preliminary measures, looking to a possible revision of the present classification in Wisconsin, in the interest of both the roads and the shippers, were discussed at length, and it was agreed to make immigrants' effects and household goods to all stations in Wisconsin class B, which will be a considerable reduction on the former maximum charges. It was also agreed to publish a joint circular by which hereafter a pass may be given to any shipper using one or more cars for the transportation of grain, fruit, vegetables, etc., in order that he may accompany it to take care of fires for the preservation of such freights until it reaches its destination. These passes will be issued from Dec. 1 to March 1, but no return pass will be issued. The meeting then adjourned until the third Wednesday in December.

Southwestern Railway Association.

A meeting was held in St. Louis, Nov. 22, which was fully attended, the general managers and freight agents of all roads in the Association being present. The object of the meeting was to organize a Colorado pool, but after three sessions nothing definite was accomplished.

On the following day, however, the Association came to an agreement and arranged the Colorado pool on the basis of 65 per cent. for the Chicago Division and 35 per cent. for the St. Louis Division, and then adjourned to meet again in Chicago Dec. 6, when the subdivision will be determined.

The Connecticut Railroad Commission Hearing on Car Couplers.

A dispatch from Hartford, Conn., Nov. 29, says: "At the last session of the Legislature a bill was introduced requiring the railroad companies of the state to use automatic couplers, and the whole matter was referred to the Railroad Commissioners, who held their first meeting to-day. Exhibits were numerous and as follows: By the Automatic Car Coupling Co., New York; Standard Co., New York; De Liva Co., Plattsburg, N. Y.; Matthews Co., Buffalo; Safford Co., Buffalo; Ames Co., Adrian, Mich.; Eureka Co., Petoskey, Mich.; Hohenstein Co., New Haven; Stewart Co., Chattanooga, Tenn.; Safety Co., Chicago, and other couplers from Worcester, Mass., Sharon Springs, N. Y., Oakville, Conn., Wickford, R. I., Dubuque, New Haven, Hartford, Boston, Bridgeport and Kansas City. These were all examined and explained, and it is said there are still more inventions to come. Railroad men generally think that compulsory legislation just now will not operate successfully because of the variations in the freight cars of different roads, but if the plan of the car-builders of the country to adopt a uniform standard of height shall prevail, the time will come when the automatic coupler can be brought into general use, but so long as old style cars are run on all roads there are obvious difficulties in the way of the proposed enactment."

ELECTIONS AND APPOINTMENTS.

Allegheny Central.—The officers of this company as consolidated are: President, Frank E. Smith, Angelica, N. Y.; Vice-President, A. W. Martin, New York; Secretary and Treasurer, Charles E. Kimball.

Baltimore & Potomac.—Mr. A. C. Hippey has been appointed Assistant Engineer with office in Baltimore, to date from Dec. 1. His jurisdiction extends over the Alexandria & Fredericksburg road.

Bodie Lumber Co.—Mr. R. N. Graves is President and Thomas Holt Superintendent of this company's railroad from Bodie to Mono in California.

Chesapeake & Ohio.—Mr. W. P. Harris has been appointed Superintendent of the Western Division, from Williamson, Va., to Huntington, W. Va., in place of J. E. Mallory, resigned. Mr. Harris has been for some time Superintendent of the New York & Greenwood Lake road; he is an energetic and intelligent railroad officer, who has done very well on the Greenwood Lake road, in spite of many difficulties and discouragements.

Mr. J. D. Yarrington, late Acting Superintendent, has been made Superintendent of the Lexington Division, with office at Lexington, Ky., from Dec. 1.

Chicago, Missouri & Kansas.—The directors of this new company are: F. A. Bitters, C. M. Condon, B. F. Hobart, C. B. Sperry, Oswego, Kan.; A. A. Harris, Ft. Scott, Kan.

Chicago & Northwestern.—The following is the official notice of a change heretofore noted: "Mr. Charles D. Gorham has been appointed Superintendent of the Wisconsin, Milwaukee & Northwestern Union divisions of this company's lines, vice Edward J. Cuyler, resigned; the appointment to take effect Dec. 1, 1881."

Chicago, Texas & Mexican Central.—Mr. L. G. Cannon has been appointed General Freight and Passenger Agent, with office in Dallas, Tex. He was formerly Treasurer of the Indianapolis, Peru & Chicago Company.

Cincinnati, New Orleans & Texas Pacific.—Mr. Cecil Fleming has been appointed General Superintendent of the Cincinnati Southern Division, with office in Cincinnati, O. He has been for some time Assistant General Superintendent of the Mobile & Ohio road.

Conewago & Clarion.—The directors of this new company are: Henry E. Brown, Wm. H. Copeland, Henry J. Miller, Charles W. Stone, Warren, Pa.; C. P. Carr, B. F. Reifsnider, Theodore E. Smith, New York.

Fitchburg.—Mr. Wm. A. Foster, Master Mechanic of the Vermont & Massachusetts Division, is Acting Superintendent of Motive Power during the absence of Mr. G. A. Coolidge.

Gulf & Chicago Air Line.—This company was recently organized by the election of the following directors: N. N. Clements, B. Friedman, James Little, John Snow, H. P. Walker, Tuscaloosa, Ala.; C. K. Foote, Mobile; C. C. Merrick, Chicago. The board elected C. C. Merrick President; N. N. Clements, Vice-President; James Little, Secretary and Treasurer; C. C. Merrick, C. K. Foote, N. N. Clements, Executive Committee.

Michigan Central.—The following circular is dated Detroit, Mich., Nov. 18: "Mr. S. C. Annable having severed his official relations with this company, to accept service with the Texas & Pacific Railway, Mr. D. D. Davis is hereby appointed Car Accountant, the appointment to take effect Monday, Nov. 21. Officers of foreign companies, also officers and agents of this company, will please note and be governed accordingly."

Mobile & Ohio.—At a meeting held in New York, Nov. 25, the holders of income debentures nominated the following directors for election by the stockholders at Mobile next week: Cornelius H. Clark, Wm. Butler Duncan, James H. Fay, A. S. Gaines, Henry Hall, Jacob Hays, Wm. H. Hays, Adrian Iselin, Jr., J. P. McMahon, W. H. Pratt, A. L. Rives, E. L. Russell, Moses Waring.

New Haven & Derby.—The new board has elected J. H. Bartholomew, President; Charles L. English, Vice-President; Francis E. Harrison, Secretary; Charles Atwater, Treasurer.

New York & Greenwood Lake.—The following is dated New York, Nov. 24: "Mr. W. P. Harris having resigned, Mr. J. H. Tinney is appointed Acting Superintendent. Resignation and appointment to take effect this day." Mr. Tinney has been Assistant Superintendent, and was formerly a conductor on the Erie.

New York, Lake Erie & Western.—At the annual meeting in New York, Nov. 29, the following directors were chosen: Solomon S. Guthrie, Buffalo, N. Y.; F. N. Drake, Corning, N. Y.; Homer Ramsdell, Newburg, N. Y.; Cortland Parker, Newark, N. J.; J. Lowber Welsh, Philadelphia; Thomas Dickson, Scranton, Pa.; Theron R. Butler, Charles Dana, Harrison Durkee, R. Suydam Grant, Hugh J. Jewett, John Taylor Johnston, Wm. Mertens, Edwin D. Morgan, Jacob H. Schiff, Henry G. Stebbins, Wm. L. Strong, New York.

Three members of the old board—J. S. Goodwir, James R. Keene and J. F. Pierson—are dropped. Their places are taken by F. N. Drake, President of the Blossburg Coal Company; Wm. Mertens, of the firm of L. von Hoffman & Co., and Jacob H. Schiff, of Kuhn, Loeb & Co., of New York. The changes strengthen the board, but do not indicate any change in policy.

New York, West Shore & Buffalo.—Mr. W. H. Smith has been appointed Resident Engineer of the Madison County Division. His address will be at Canastota, Madison County, N. Y. Mr. Smith has been on the New York, Lake Erie & Western road.

Norfolk & Western.—Mr. C. P. Hatch is appointed General Freight and Passenger Agent, with office in Lynchburgh, Va. He will continue to hold the same office on the Shenandoah Valley road also.

Northern Central.—Mr. A. C. Hippey is appointed Assistant Engineer of the Baltimore Division, with office in Baltimore, to date from Dec. 1.

Northern Pacific.—Mr. Edgar M. Marble has been appointed Land Commissioner. Mr. Marble was several years Assistant Attorney General for the Interior Department at Washington, and for some time past has been Commissioner of Patents.

Ohio Central.—Mr. F. H. Pease has been appointed Train-Master, in place of Mr. Wm. Thornburg, who has gone to the Cleveland, Tuscarawas Valley & Wheeling road.

Parkersburg Branch.—At the annual meeting Nov. 28 the following were chosen: President, S. Spencer; directors, Caleb Boggs, W. Burns, J. N. Camden, W. N. Chancellor, George R. Dennis, John W. Garrett, Robert Garrett, Decatur H. Miller, Thomas Swann, W. W. Taylor. The road is owned by the Baltimore & Ohio.

Peoria & Farmington.—Mr. D. P. Phelps is General Manager of this new road and J. F. Wallace, General Freight and Passenger Agent. Office in Peoria Ill.

Philadelphia, Wilmington & Baltimore.—Mr. I. N. Mills, formerly General Agent of the Delaware Railroad, has been appointed Superintendent of the Delaware Division, including the Delaware Railroad and all its branches.

Prince Edward Island.—Mr. Joseph Unsworth has been appointed Mechanical Superintendent and Storekeeper. He was recently on the Intercolonial road.

Rocky Mountain.—This company was recently organized at Helena, Montana, by the election of the following directors: A. H. Barney, Frederick Billings, Joseph T. Dodge, Samuel T. Hauser, A. M. Holter, Thomas F. Oakes, W. F. Sanders, Edwin Stone, Henry Villard. The board elected Samuel T. Hauser President; Thomas F. Oakes, Vice-President; Edwin Stone, Secretary and Treasurer. The organization is in the Northern Pacific interest.

St. Paul, Minneapolis & Manitoba.—The following circular from President George Stephen is dated Nov. 28: "At a meeting of the board of directors the following changes were made, in effect from and after Dec. 1, 1881:

"Mr. James J. Hill was elected Vice-President vice Mr. R. B. Angus, resigned.

"Mr. Allen Manvel was appointed General Manager vice Mr. James J. Hill, elected Vice-President."

Mr. Manvel has been Assistant General Manager for some time and was formerly on the Rock Island road.

Wilmington, Columbia & Augusta.—At the annual meeting last week the following directors were chosen: H. B. Short, Columbia, S. C.; R. R. Bridgers, Wilmington, N. C.; George S. Brown, Thomas C. Jenkins, B. F. Newcomer, Enoch Pratt, S. M. Shoemaker, W. T. Walters, Baltimore; J. Donald Cameron, Harrisburg, Pa.; H. B. Plant, New York. The board re-elected R. R. Bridgers President.

Wilmington & Weldon.—At the annual meeting last week the following were chosen: President, R. R. Bridgers, Wilmington, N. C.; directors, A. J. DeRosset, Duncan McRae, Wilmington, N. C.; George Howard, Tarboro, N. C.; E. B. Borden, Goldsboro, N. C.; W. H. Willard, Raleigh, N. C.; B. F. Newcomer, Thomas C. Jenkins, S. M. Shoemaker, B. F. Walters, Baltimore; H. B. Plant, New York.

Wisconsin Central.—Mr. C. C. McCloud is appointed Traveling Auditor in place of Mr. H. C. Matthews, who has gone to the Denver & Rio Grande road.

PERSONAL.

—Mr. George Hibbert, formerly Master Car-Builder of the Cincinnati Southern road, died in Chattanooga, Tenn., Nov. 13 last.

—Mr. George A. Coolidge, Superintendent of Motive Power of the Fitchburg Railroad, has received leave of absence on account of ill health, and will make a trip to Europe.

—Mr. Theodore S. Faxton, a prominent citizen of Utica N. Y., died in that city Nov. 30, aged 87 years. He wa one of the projectors of the Utica & Black River road, and was the first President of the company.

—Mr. R. B. Angus has resigned his position as Vice-President of the St. Paul, Minneapolis & Manitoba Company. He will hereafter live in Montreal and devote his whole time o the affairs of the Canadian Pacific road.

—Mr. Charles D. Gorham, who has left the Western Division of the Pittsburgh, Ft. Wayne & Chicago for the Chicago & Northwestern road, was recently presented with a valuable gold watch by the employés of his old road.

—It is reported that Gen. J. H. Devereux is to have charge of all the Vanderbilt lines west of Buffalo, a new position being made for him. A report to the same effect was widely spread a few years ago, but nothing came of it. It is understood, however, that Mr. Devereux has the confidence of Mr. Vanderbilt to a remarkable degree.

—Mr. Wm. Rushton, for many years Master Mechanic of the Atlanta & West Point road and a member of the Master Mechanics' Association, died at Atlanta, Ga., Nov. 24. He was born in England, but had lived in Atlanta 38 years, all that time being in the employ of the Georgia or the West Point road. His death was sudden, although his health has been failing for several months.

—Mr. Wm. P. Shinn, who has displayed remarkable capacity in very different positions of importance, has established himself in New York in partnership with Mr. W. C. Andrews under the firm name of Wm. P. Shinn & Co. Mr. Shinn, who was trained as a civil engineer, more than twenty years ago was General Freight Agent of the Pittsburgh, Ft. Wayne & Chicago Railway; he was later Vice-President of the Allegheny Valley road, and acted as an expert of the Pennsylvania Railroad Company to examine and report upon railroads which the company purposed acquiring. For four years he was General Manager of the Edgar Thomson Steel Works, and later, for a short time, of the Vulcan Steel & Iron Works, of St. Louis. In 1880 he was President of the American Institute of Mining Engineers, and he is a member of the American Society of Civil Engineers. His firm purposes to do the financing for new railroad, mining and manufacturing enterprises. Its office is at No. 16 Courtlandt street.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1881.	1880.	Inc. or Dec.	P.c.
Ten months ending Oct. 31:				
Northern Central	$4,479,917	$4,097,023	I. $382,894	9.3
Net earnings	1,327,807	1,411,610	D. 83,803	5.9
Pennsylvania	36,552,212	34,137,327	I. 2,414,885	7.7
Net earnings	14,750,839	14,114,698	I. 636,141	4.5
Nine months ending Sept. 30:				
Carolina Central	$414,532	$334,058	I. $80,474	24.1
Houston & Tex. Cen.	2,656,287	2,387,261	I. 269,026	11.3
Month of September:				
Carolina Central	$54,310	$57,839	D. $3,529	6.1
Houston & Tex. Cen.	381,517	409,368	D. 27,851	6.8
Month of October:				
Northern Central	$449,664	$512,918	D. $63,254	12.3
Net earnings	79,341	249,676	D. 170,335	68.2
Pennsylvania	3,672,071	3,882,714	D. 209,743	5.4
Net earnings	1,355,022	1,688,394	D. 333,362	19.7
Third week in November:				
Bur., Cedar Rap. & No.	$44,905	$44,706	I. $199	0.4
Chi., Mil. & St. P.	366,000	336,592	D. 23,408	7.0
Chi., St. P., Minn. & O.	75,456	79 125	D. 3,673	4.6
Col., Hock. V. & Tol.	54,593	47,593	I. 7,000	14.6
Den. & R. G.	132,605	80,977	I. 51,6 '8	63.7
Flint & Pere M.	38,000	35,041	I. 2,959	8.5
Hann. & St. Jo.	45,516	48,294	D. 2,778	5.8
Louisville & Nash	253,540	217,900	I. 35.640	16.4
Mil., Lake Sh. & W.	14,625	10,694	I. 3,931	36.7
St. L. & San Fran	66,700	63,600	I. 3,100	4.8
St. P., Minn. & Man.	127,789	65,226	I. 62,563	95.9
Week ending Nov. 5:				
Grand Trunk	£47,096	£46,642	I. £454	9.7
Week ending Nov. 19:				
Chi. & Gd. Trunk	$34,760	$32,122	I. $2,647	8.3

Illinois Freight Rates.

A dispatch from Chicago, Nov. 26, says: "The Chicago & Alton Company has decided upon a new freight tariff, to take effect Dec. 1, which prescribes rates substantially the same as those recently ordered by the Illinois Railroad & Warehouse Commission. The managers say that they do this without conceding the right of the Commission to fix

rates for the road, but they desire to escape expensive and vexatious litigation until the cases now pending in the United States Supreme Court are decided.

"The Illinois Central and the Chicago, Rock Island & Pacific companies take the same course for the same reasons. The other roads have not yet announced their intentions."

New England Railroad Returns.

The following figures are from reports made to the Massachusetts and Connecticut Railroad Commissions for the year ending Sept. 30:

	Earnings.	Expenses.	Net earn.
Boston & Maine	$2,667,246	$1,727,090	$940,156
1880	2,532,653	1,598,218	934,435
Cheshire	662,595	487,184	175,411
1880	602,750	438,162	164,488
Norwich & Worcester	799,713	460,446	339,267
1880	741,968	405,848	336,120

Coal Movement.

Coal tonnages reported for the week ending Nov. 19 are as follows:

	1881.	1880.	Increase.	P. c.
Anthracite	650,285	636,391	13,894	2.2
Semi-bituminous	114,100	91,272	22,828	25.0
Bituminous, Penna.	62,680	48,827	13,833	28.6
Coke, Penna.	47,576	38,950	8,617	22.1

Coal traffic of all kinds continues very active, though the present indications are that the winter will not be a very severe one.

Shipments of coal over the Seattle & Walla Walla road and by sea from Seattle, Wash. Ter., in October were 9,949 tons. For the ten months ending Oct. 31 the shipments were: 1881, 116,349; 1880, 105,436; increase, 10,913 tons, or 10.4 per cent.

Grain Movement.

For the week ending Nov. 19 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments. Total.	By rail.	P. c. by rail.	Atlantic receipts.
1874	2,222,849	1,042,633	278,362	26.7	3,977,044
1875	3,276,429	2,376,015	876,901	36.9	4,057,145
1876	2,855,645	2,679,746	1,272,753	47.5	4,329,868
1877	3,024,676	2,717,945	461,569	17.0	5,789,879
1878	4,210,803	2,782,672	689,159	24.8	5,649,859
1879	3,540,174	3,476,939	594,979	17.1	5,850,402
1880	5,226,385	4,928,795	2,287,205	46.4	6,991,471
1881	3,233,458	2,845,736	2,008,138	70.6	3,990,804

The receipts of the Northwestern markets for the week were smaller than in any other year of the eight except 1874 and 1876, and nearly 2,000,000 bushels less than last year. Compared with previous weeks of this year, they are the smallest since March. The shipments of these markets were nearly 2,100,000 bushels less than in the corresponding week of last year, 843,000 less than the previous week, and the smallest since the second week of April. The lake shipments were notably small, considering that navigation was rather better than usual at this season. But the entire lake shipments of the week were but 690,326 bushels, against 2,640,000 in the corresponding week of last year, 2,882,000 in 1879, 2,093,000 in 1878 and 2,256,000 in 1877. The rail shipments were larger than in the previous week. The river shipments of the week were 147,272 bushels, or 5.2 per cent. of the whole, and the largest for 15 weeks. The Atlantic receipts were 3,000,000 bushels less than in the corresponding week of last year and the smallest since 1874. They were, however, a little larger than the week before, and the largest for six weeks.

Of the Northwestern receipts Chicago had 47.9 per cent., St. Louis 13.7, Peoria 10.4, Milwaukee 9.1, Toledo 6.5, Duluth 4.5, Detroit 4.4, and Cleveland 3.5 per cent. Nearly all the decrease of the week was at Chicago, whose receipts have not been so small before since the middle of May, nor its percentage of the total so small since the end of May.

Of the Atlantic receipts New York had 66.1 per cent., Boston 10.4, Philadelphia 8.3, Baltimore 8.3, New Orleans 3.5, Montreal 3.1, and Portland 0.3 per cent. The receipts at New York are the largest for six weeks and a larger percentage of the whole than in any other week of the year except one, when a fleet of blockaded canal boats arrived. Montreal's receipts are not a third of its average while navigation is open, and are almost its last river receipts of the season, doubtless. There is not much change from the previous week at the other ports, but such a gain at New Orleans as to make its receipts the largest since September. In November last year receipts at New Orleans were quite heavy.

Exports from Atlantic ports for five successive weeks have been:

1881.	Week ending. Nov. 23.	Nov. 16.	Nov. 9.	Nov. 2.	Oct. 26.
Flour, bbls.	59,855	80,671	42,202	39,620	58,500
Grain, bu.	2,143,163	2,473,746	1,841,120	1,898,996	2,761,643
1880.					
Flour, bbls.	142,442	112,022	130,806	92,893	75,575
Grain, bu.	4,112,718	4,692,963	4,701,048	5,072,436	5,302,054

It is noticeable that the flour movement, which continued much larger than the grain movement for a long time after the grain movement showed a decrease, now is very much smaller than last year and not much larger than in previous years. This is true of Northwestern receipts, of Atlantic receipts and of exports. Yet the gain in flour over last year remains enormous—one-third in Northwestern receipts, 40 per cent. in Northwestern shipments, 17½ per cent. in Atlantic receipts.

For the week ending Nov. 25 receipts and shipments at Chicago and Milwaukee were:

	Receipts. 1881.	1880.	Shipments. 1881.	1880.
Chicago	1,203,413	2,269,359	906,523	2,722,353
Milwaukee	253,073	555,660	82,261	242,745
Both	1,456,486	2,825,019	988,784	2,965,098

The receipts are little more than half as great as last year, and the shipments but one-third as great.

Receipts and shipments at Buffalo for the week ending Nov. 25 were:

	Receipts. 1881.	1880.	Shipments. 1881.	1880.
By water	479,800	1,624,000	126,775	1,002,282
By rail	428,200	538,900	735,800	1,510,950
Total	908,000	2,162,900	862,575	2,513,232

The total receipts are nearly 60 per cent. less than last year, the lake receipts being 70 per cent. less. The total shipments were 65 per cent. less than last year, and the canal receipts but one-eighth as great, though the canal was open but about one-half of the week last year, while it promises to be open a week longer this year.

Receipts at four Eastern ports were, in this week ending Nov. 25:

	New York.	Boston.	Phila.	Baltimore.	Total.
1881	2,702,722	354,455	204,420	367,534	3,629,131
P. c. of total	74.5	9.8	5.6	10.1	100.0
1880	3,693,205	424,660	490,800	1,223,576	5,832,241
P. c. of total	63.3	7.3	8.4	21.0	100.0

The decrease is most marked at Baltimore, and New York and Boston together have 84.3 per cent. of the whole this year, against 70.6 last.

Traffic of New York Canals.

For the week ending Nov. 22 the Canal Auditor reports 157,866 tons, against 264,870 tons in the corresponding week of last year—a decrease of 107,004, or 40 per cent. Boat mileage and tolls are not reported.

Leading items of freight shipped were, in tons:

	1881.	1880.	Inc. or Dec.	P. c.
Lumber	45,512	48,336	Dec. 2,824	5.8
Grain	34,532	123,853	Dec. 89,321	72.1
Apples and potatoes	8,742	18,493	Dec. 9,751	52.7
Iron and iron ore	17,844	16,153	Inc. 1,691	10.5
Coal	24,794	29,153	Dec. 4,359	15.0

The week last year was the last in which there were any shipments of moment, as the canal froze in many places by the 21st. This year the shipments of certain freights have almost ceased since that week, because of the unprofitable rates offered, but apparently coal and iron ore will continue to go forward as long as the canal is open, though it is now hardly worth while to ship coal to Buffalo, because it cannot be forwarded thence by lake, and what goes from Buffalo by rail arrives there by rail, avoiding a transfer.

We include apples and potatoes among the freights mentioned this week, rather to show the extent to which railroads are burdened with this kind of traffic at this season of the year, when every effort is made to get such articles to market before freezing weather. There was an enormous crop of both apples and potatoes last year, and at times some of the New York roads required more cars for them than for grain.

Transportation of Explosives.

Mr. Charles G. Eddy, General Freight Agent of the Chicago & Northwestern Railway, has just issued the following circular to agents regarding the shipment of explosives by his line: "Agents are instructed that hereafter they will not receive on the company's grounds, depots or buildings high explosives of any kind whatever. Agents will receive ordinary gunpowder and common blasting powder in iron or wooden packages, for transportation in full car-loads of not less than 20,000 pounds. Quantities less than car-loads will not be received, unless in magazines, or packages completely and securely boxed, contents to be plainly marked on outside of package. In cases where agents are in doubt as to the contents of a package tendered for shipment, they are instructed to open it, and, if found to contain ordinary gunpowder, or blasting powder, they can forward the shipment, taking care, however, that the package is entirely and securely inclosed. If found to contain any other explosive, agents will refuse shipments, and insist upon immediate removal from the company's premises."

November Receipts at Chicago and Milwaukee.

Receipts at Chicago and Milwaukee during the month of November for four successive years have been:

	1878.	1879.	1880.	1881.
Chicago:				
Grain, bu	9,393,209	8,882,550	11,252,905	7,528,846
Flour, bbls	337,199	355,538	449,709	285,124
Hogs, No	909,093	827,286	1,113,613	828,446
Milwaukee:				
Grain, bu	3,023,049	2,825,806	2,519,663	1,185,736
Flour, bbls	252,904	239,738	294,952	251,115
Hogs, No	138,749	132,551	152,815	134,354

There is a large decrease from last year in grain, flour and hogs at both places.

OLD AND NEW ROADS.

Baltimore & Ohio.—Philadelphia papers report that a conference was held on Nov. 26, between Vice-President Robert Garrett and George F. Work, President of the Philadelphia & Chester County road, in relation to the sale of that railroad, which Mr. Work controls. This charter was obtained with a view to the building of a railroad from Philadelphia to Unionville. The survey has been made, the route has been graded and 2½ miles of the line have, within the past two months, been placed under track. Leaving Thirty-first and Chestnut streets the route runs through the village of West End, crosses Cobb's Creek, cuts through the little manufacturing town of Cardington, crosses the West Chester turnpike about two miles beyond, and running less than a mile south of Cooperstown, passes through the valley of Darby Creek to Newtown Square, thence near White Horse village, Sugartown and Goshenville to West Chester. From West Chester, by way of the forks of the Brandywine, the route runs through Copeville to Downingtown, while a branch from the forks of the Brandywine runs through Unionville, west of West Chester to Doe Run.

If the Baltimore & Ohio buys the charter the proposition is to run a branch off from a point near the village of West End on the outskirts of West Philadelphia in a northeasterly direction and connect with the Reading at a point near Wayne Junction, which will make a direct route from New York to Baltimore and Washington and the South and West. The building of a line from Baltimore to connect with this Philadelphia link is regarded by the Baltimore & Ohio people as a matter of secondary importance. President Work, while not denying the conferences that have taken place between himself and the Baltimore & Ohio people with reference to the new line, says that their negotiations have not reached that stage which would warrant anything in the way of details being made public. The route is considered by Philadelphia railroad men as the most practicable of any yet developed for the Baltimore & Ohio's purposes. Meantime another conference between Mr. Work and President Garrett's representatives is appointed for this week.

Bellaire & Southwestern.—With the change in its articles of incorporation providing for an extension of the road from Woodsfield, O., to Cincinnati, this company changes its name to the Cincinnati, Shawnee & Wheeling Railroad Company.

Belleville & Carondelet.—Work is now in progress on this road, which is to extend from Belleville, Ill., to East Carondelet, about 15 miles, with a branch four miles long to Georgetown. It will be chiefly a coal road, and will be the fourth road out of Belleville.

Bodie Lumber Co.—This company has recently completed a railroad of 3 ft. gauge from Bodie, Cal., to Mono Mills, a distance of 31.6 miles. It is intended chiefly to transport lumber from the mills to Bodie, which is the centre of a large mining district. It runs through a rough and hilly country and has curves as sharp as 280 ft. radius, and 7 miles on which the grade is 200 to the mile. In two places switch-backs have been required to overcome the rise. The track is laid with 35 and 40 lbs. steel rails. The road has no connection with any other, and all the material used in its construction had to be hauled about 70 miles by wagon.

Boston & Maine.—This company has under consideration the elevation of its tracks in Boston. The plan proposed is to begin the grade at Somerville, gradually rising to the required height and to enter Boston some 20 ft. above the present level, transferring the passenger station to the second story of the present building. The change will avoid two troublesome grade crossings over the Fitchburg and the Eastern tracks.

Burlington & Missouri River in Nebraska.—Work is progressing rapidly on the extension to Denver, and the graders are now at work in Colorado, having crossed the Nebraska line. Work has also been begun on the Denver end, and contracts for 50 miles out of Denver have been let, and 50 miles more will soon be ready for letting.

California Southern.—Track was laid on this road for 8.14 miles during the month of October, making 22.14 miles now laid from San Diego, Cal., northward.

Canada Southern.—The yardmen on this road at St. Thomas, Ont., struck on Nov. 28, and proceeded to place cars on the switches in such a manner as to block the yard completely. They forcibly resisted officers of the road, who collected a gang of laborers and set to work to clear the yard. A number of the strikers were arrested.

Cape Fear & Yadkin Valley.—A proposition has been made by an organization, known as the New York & Southern Railroad & Telegraph Construction Company, to buy the controlling interest in this road held by the state of North Carolina. The company offers to pay the state $55,000 for its stock, and to assume the floating debt of the road, amounting to about $100,000. Governor Jarvis has appointed a meeting of the commissioners charged with the care of the state's interest to be held in Raleigh, Dec. 19.

The company making the offer of purchase proposes to build a line, of which this road is to be part, from Wilmington to Cincinnati, by way of Fayetteville, Greensboro and Mt. Airy, with branches to Ashland, Ky., Big Sandy, W. Va., Patterson, Ore Knob and Goldsboro, N. C., and Florence, S. C. The North Carolina lines will be covered chiefly by this company's charters.

Carson & Colorado.—This company has filed the necessary articles in California for a branch or extension of its road from the Nevada state line in Mono County, Cal., by Owen Valley and Lake in Inyo County and across the Mohave Desert to the Southern Pacific road at or near Mohave in Kern County. The estimated distance is 204 miles.

On the road in Nevada the track is now laid to a point 23 miles beyond Hawthorne and 123 miles from the junction with the Virginia & Truckee at Mound House. Grading is completed to Belleville, some distance further.

Central Iowa.—This company has adopted amended articles of incorporation, providing for the building and purchase of branch lines; also for the increase of the capital stock to $6,000,000, and for the limitation of the debt to two-thirds of the amount of the stock.

It is again reported that the road will soon pass under the control of the Wabash, St. Louis & Pacific Company.

Central, of Georgia.—The Blakely Extension of this company's Southwestern Railroad was completed and opened for business on Nov. 21 to Blakely, Ga., 50 miles southwest of Albany and 14½ miles beyond Arlington, which has been the terminus of the extension for several years. Blakely is a thriving town and the centre of a prosperous cotton region.

Central, of New Jersey.—At a meeting of the board held Nov. 29 Receiver Lathrop gave notice that the affairs of the company were in such a state that he had no doubt he could retire from his present office by the middle of next January, and he asked the appointment of a committee to co-operate with him in making the necessary preparations, which include the closing up of his accounts and the clearing away of the floating indebtedness. The following committee was appointed: G. G. Haven, F. A. Potts and Col. Kean. The directors also ratified the agreement with the Pennsylvania road for the joint use of the Long Branch Division.

Laurens.—The South Carolina Court has entered an order confirming the sale of this road and ordering its transfer to the Columbia & Greenville Company as purchaser.

Central Vermont.—The report of the special masters in the Langdon suit came up before the Court of Chancery at St. Albans, Vt., Nov. 26. In order to bring the case before the Supreme Court for final decision as soon as possible, the Chancellor decided to enter a *per forma* decree, ordering a foreclosure in favor of the trust bondholders as against the Vermont Central bondholders and the Vermont and Canada Company; ordering that unless said parties pay what is now due on the trust debt and provide for the payment of the same as it may accrue hereafter, they shall be foreclosed of all equity of redemption in the Vermont Central, the Vermont & Canada and other properties. An appeal was taken and the case goes to the Supreme Court at once.

Chesapeake & Ohio.—A dispatch from Louisville, Ky., Nov. 26, says: "There have been many rumors circulating around town for the past two weeks in regard to the Chesapeake & Ohio and its plans for entering Louisville. To-day these rumors have taken a definite shape, and a prominent Louisville & Nashville official informed the *Commercial* correspondent to-night that Gen. Echols had been in close consultation with the officers of his company for several hours to-day, and the result of that conference is that the Lexington Branch of the Short Line and the Chesapeake & Ohio will be run virtually as the same road, giving the latter an unbroken line from Newport News to this city. It was further agreed that the Louisville & Nashville should fix the rates on east-bound freight and the Chesapeake & Ohio on west-bound. Gen. Echols went to Lexington to-night, but will return Monday, when Gen. Alexander will also be here, and the final arrangements will then be completed. It can also be said on good authority that Huntington has secured a perpetual lease of the Cecilian Branch, giving him a through route to Paducah, there connecting with his Memphis road. It is expected that through trains, both freight and passenger, will be running from this city to Newport News by the middle of next month, furnishing Louisville with an outlet to the seacoast much shorter than by any other route."

Chesapeake, Ohio & Southwestern.—Work is now progressing actively on the gap in this road between Trimble, Tenn., and Covington. The bridges over the Hatchie and Forked Deer Rivers are going up and a large force is at work on the grading. Track on the northern end is laid to Newbern, six miles south by west from Trimble, and is expected to reach Dyersburg, 12 miles further, this month.

Chicago, Burlington & Kansas City.—This company, which has lately filed articles of incorporation, is organized by the bondholders of the old Burlington & Southwestern Company, and is, it is understood, controlled in the interest of the Chicago, Burlington & Quincy. The completed line of the road is from Viele, Ia., to Laclede, Mo., 156 miles, and the new company intends to build the road through to Kansas City.

Chicago, Milwaukee & St. Paul.—Notice is given that 40 land-grant income bonds of this company were, on

Nov. 30, drawn for redemption in accordance with the terms of the mortgage. The numbers drawn are: 2, 22, 33, 54, 74, 78, 81, 86, 87, 104, 129, 130, 140, 144, 171, 180, 193, 204, 206, 218, 219, 234, 252, 255, 256, 268, 296, 302, 305, 316, 320, 332, 336, 341, 345, 348, 355, 356, 368 and 382. These bonds will be paid at the company's office in New York at 105 and interest accrued. Interest upon them will cease from Jan. 1 next.

Chicago, Missouri & Kansas.—This company has filed articles of incorporation for a railroad from a point on the Missouri River in Saline County, Mo., southwest into Kansas and thence west to the Colorado line, with branches to Ft. Dodge and other points; about 600 miles in all.

Chicago & Northwestern.—Track is now all laid on the Milwaukee & Madison Division from Milwaukee to Madison, Wis. The new line is 81 miles long, and will be opened for business shortly.

Chicago, Streator & Bloomington.—This company has filed articles of incorporation to build a railroad from Chicago southwest to Streator and thence southward to Bloomington. The distance is about 130 miles, and the capital stock is to be $1,200,000.

Chippewa Falls & Northern.—This road is now graded from Chippewa Falls, Wis., to Bloomer, 15 miles, and tracklaying has been begun. Grading parties are at work beBloomer and Rice Lake.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company is reported to be considering the question of building a branch or extension from Martinsville, Ind., to Odin, Ill., to connect with the Illinois Central. The line would be about 160 miles long, running between the Vandalia Line and the Ohio & Mississippi. The report does not seem to have very solid foundation.

The following statement has been published for the three months of the fiscal year from July 1 to Sept. 30:

	Earnings.	Expenses.	Net earn.
July	$177,160	$99,488	$77,672
August	237,283	120,572	116,711
September	231,042	130,000	101,042
Total	$645,485	$350,060	$295,425
One-quarter of yearly fixed charges		$159,237	
October dividend, 1½ per cent		90,000	
			249,237
Balance, surplus			$46,188

These figures do not include about $16,000 rentals due or received. September expenses are partly estimated.

Cleveland, Mt. Vernon & Delaware.—The Receiver reports to the Court for October total cash receipts of $58,373.10; disbursements, $38,895.33, leaving $19,477.77 on hand Nov. 1. The receipts include $9,000 borrowed under order of the Court.

Conewago & Clarion.—This company has been organized to build a railroad from Warren, Pa., southward to a point on the Clarion River in the coal fields of Jefferson County. The distance is about 40 miles.

Danbury & Norwalk.—Surveys are being made for an extension of this road from the present terminus at South Norwalk, Conn., to deep water at Wilson's Point. The line is about a mile long. The company will build a dock for the transfer of coal and other freight at Wilson's Point.

Danville, Olney & Ohio River.—Track on this road is now laid to Sidell's Grove, Ill., 21 miles northward from the late terminus at Kansas, and 73 miles from the southern end of the road at West Liberty. From Sidell's Grove the road will run to Danville, 28 miles, on the track of a branch of the Chicago & Eastern Illinois, which will be completed to that point in a few weeks, weather permitting.

Delaware, Lackawanna & Western.—New car shops are to be built for the Morris & Essex Division at Dover, N. J., in place of those burned down some months ago. They will be of brick with all possible protection against fire.

Denver & New Orleans.—This company has finally decided to adopt the line surveyed by way of Pueblo, Col., as the location of the road.

Denver & Rio Grande.—This company has notified the New York Stock Exchange of an issue of $5,000,000 of its capital stock for the purpose of extending the lines in Colorado to connection with the Denver & Rio Grande Western Railway at the boundary of Utah, for laying third rail between Denver and Pueblo and making necessary changes in superstructure therefor and for other improvements. It is said that the stock has been negotiated in London.

A considerable force has been at work on the Utah end of this company's Salt Lake Extension, and work is to be begun at several points on the line in Colorado shortly, the object being to secure the cañons and passes on the line as soon as possible. The route surveyed passes through Salina Pass, Clear Creek Cañon, Cove Fork, Antelope Springs, Iron Springs and Iron City.

East & West, of Alabama.—This company has been organized to build from Birmingham, Ala., eastward to the Georgia line, where the road will connect with the Cherokee Railroad. The corporators are John W. Inzer, John Postell and Amos G. West.

Elizabeth City & Norfolk.—Tracklaying on the Edenton Extension was completed last week, and trains will soon begin to run to the new terminus. Edenton is 29 miles west by south from the late terminus at Elizabeth City, N. C., and 73 miles from Norfolk. There will probably be a formal opening of the road soon.

Genesee Valley.—Track is now laid on this road (which uses the old Genesee Valley Canal as a road-bed) from near Rochester, N. Y., southward 23 miles. The work will be continued as fast as the rails arrive.

Gonzales Tap.—This company has been organized to build a railroad from the town of Gonzales, Tex., northeast to the Galveston, Harrisburg & San Antonio road near Waelder; the distance is about 14 miles.

Greeley, Salt Lake & Pacific.—Grading on this road has been in progress for some time, and tracklaying was recently begun from Greeley, Col,, westward.

Green Bay, Winona & St. Paul.—It is reported that the Chicago & Northwestern Company has bought this road (formerly the Green Bay & Minnesota), from Mr. John I. Blair and associates. The price paid for Mr. Blair's interest is said to have been over $600,000.

Greenville & Bowie.—This company has been organized to build a railroad from Trippe, Ark., the junction of the Little Rock and Texarkana lines of the Little Rock, Mississippi River & Texas road, southeast to a point on the Mississippi opposite Greenville, Miss. The distance is about 20 miles.

Gulf & Chicago Air Line.—This company has been organized to build a railroad from Mobile, Ala., northward through Central Alabama to the Tennessee line, to connect there with another line to be built through Tennessee and Keutucky to the Ohio River.

Leavenworth, Topeka & Western.—Work is now in progress on the grading of this road from Leavenworth, Kan., to Topeka. The contracts call for the completion of the road by March next.

Massachusetts Central.—Track is now laid to Jefferson station in Holden, Mass., the crossing of the Boston, Barre & Gardner road. Trains will probably begin to run to the new terminus, which is 46 miles from Boston, next week.

Millbank, Kibby & Tower City.—This company has been organized to build a railroad from Tower City, Dak., to connect with the Chicago, Milwaukee & St. Paul at Millbank.

Mississippi, Arkansas & Texas.—This company has been incorporated to build the Georgia Pacific line through Arkansas. The road proposed is from a point on the Mississippi River opposite Greenville, Miss., nearly due west to Texarkana, about 180 miles. Much of the line is parallel and near to that surveyed for the Texarkana line of the Little Rock, Mississippi River & Texas road.

Newark, Orange & New York.—Notice is given of application to the Legislature of New Jersey for a charter for a company by this name with authority to build a railroad from Orange, N. J., to Newark, with power to extend the same to Jersey City; the road to be partly a surface and partly an elevated road. Application will be made for a special charter, as it is doubtful whether an organization under the general railroad law would have the requisite authority to build an elevated railroad as proposed through the city of Newark.

New England Railroads in the Census.—Mr. Robert P. Porter, Special Agent of the Census Office, has submitted the following brief summary of the traffic and fiscal operations of the railroads in the New England states, which forms Group I in the railroad system of the country:

PERMANENT INVESTMENTS.

Construction	$278,213,253.69	
Equipment	28,247,904.59	
Lands and real estate	3,488,211.30	
Stocks	5,621,401.07	
Bonds	3,588,641.17	
Telegraph, etc	3,754,656.20	
		$331,914,068.02

EQUIPMENTS.

Locomotives	1,733
Passenger cars	2 075
Mail, baggage and express cars	670
Freight cars	31,211
Other cars	2,586

MISCELLANEOUS.

Capital stock paid in	$190,573,801.03
Funded debt	108,996,206.65
Floating debt	143,830,724.80
Total income	51,545,127.30
Total expenses	32,422,246.54
Net income	19,122,880.76
Number of roads operating, leased or under construction	144
Number of miles of railroad operated	5,889.41
Number of passengers carried	52,156,704
Number of tons of freight carried	24,257,736
Number of persons employed in operating roads	31,631
Number of employés and others killed	250
Number of employés and others injured	318

Groups II, III, IV, V and VI, embracing all the other railroads in the United States, are now being tabulated, and will be issued in bulletin form at an early date.

New York Central & Hudson River.—The connections with the new third and fourth tracks between Buffalo and Rochester have now been completed, and the company has four tracks in use all the way, except for a short distance at the Erie crossing in Batavia.

Surveys have recently been made from Utica west to Oneida, and it is reported that a loop line will be built, which will avoid the circuit around by Rome which the present tracks take.

New York, Chicago & St. Louis.—We are informed that track is now laid on this road as follows: Ashtabula, O., west, 15 miles; Painesville, O., west, 22; Fostoria, O., east, 15; Fostoria, west to Ft. Wayne, Ind., 91; Hadley, Ind., west, 2; Wanatah, Ind., to just east of Argos, 47; Hobart, Ind., east, 8; a total of 200 miles, being an increase of 83 miles since our last statement.

Of the above 200 miles of track 77 miles have been ballasted. Rainy weather during the last six weeks has very much interfered with tracklaying, which is still being pushed as rapidly as possible. Work on the several larger bridges still progresses, though masonry in the city of Cleveland is necessarily suspended owing to the cold.

The Cleveland or Cuyahoga Valley viaduct is to be double-track, and will have a total length of 2,987.82 ft., height at Cuyahoga River, above ordinary stage of water, 68 ft., and has a draw of 320 ft. There will be about 8,000 cubic yards of masonry and about 28,000 ft. of piling. The total cost of the superstructure will be about $250,000.

There will be other structures in Cleveland city limits, requiring about 4,500 cubic yards masonry and iron work, aggregating about 1,050 in length. There will be about 1,900 lineal feet double-track iron bridges between Buffalo and Brocton, N. Y. Between Brocton and Cleveland there are nine wrought-iron viaducts, varying in length from 572 ft. to 1,470 ft., and in height from 48 ft. to 98½ ft., the total length being about 8,000 lineal feet.

West of Cleveland, Rocky River is crossed by a bridge 672 ft. in length. At Black River there will be a 200-ft. draw span.

Between Buffalo and Chicago there will be about 14,500 ft. of iron bridges. During the winter work on the entire line will be pushed as fast as the weather will permit.

New York, Lake Erie & Western.—The board has met the demand of the preferred stockholders by declaring a dividend of 6 per cent. on the preferred stock from last year's earnings. Payment of a year's interest on the income bonds has also been ordered.

The company has bought the entire stock of the Blossburg Coal Company, which owns about 28,000 acres of coal lands, with several very productive mines, in Tioga County, Pa. The mines produce an excellent quality of bituminous coal, which is extensively sold. The Blossburg Company also owns the Tioga and the Elmira State Line roads, which together form a line from Elmira, N. Y., to Blossburg, Pa., 45 miles, with branches to Lawrenceville, 3 miles, and to Arnot, 4 miles. This road, which has a considerable business, chiefly in coal, will be added to the Erie branches. The road is also part of the line to the Erie coal property in Pennsylvania, to which the company is now building a line from Arnot.

The price paid is said to have been about $2,000,000. A large part of the stock transferred was owned by Jay Gould, and it is understood that he is to take in payment the Grand Opera House property in New York, which this company has been trying to dispose of for a long time.

New York & New England.—Nothing further has been made public as to Jay Gould's supposed control of this road. The transfer books have been closed for the annual meeting, and it is stated that there is nothing on the book to indicate that Mr. Gould holds any large amount of the stock. This, however, is no indication that he does not really control it, and probably there will be no definite news until the meeting next week.

New York, Texas & Mexican.—Track on this road is now laid from Rosenberg Junction, Tex., on the Gulf, Colorado & Santa Fe road, south by west to East Bernard, 15 miles. The company expect to reach Victoria, 100 miles, by March 1.

Ohio.—The report that a settlement of the fight over the consolidation by which this company was formed had been made by a compromise agreement between the Vanderbilt and the Erie parties is denied by officers of the company.

Ohio River & Lake Erie.—This company has been incorporated to build a railroad from Sharpsville, Pa., northward to Girard in Erie County, about 60 miles. It is intended to be a branch of the New York, Chicago & St. Louis road, and will be parallel to the Erie & Pittsburgh.

Ontonagon & Brule River.—Grading on this road is reported finished from Ontonagon, Mich., on Lake Superior, eastward 20 miles, and iron laid for eight miles. Contracts are to be let for another section of 20 miles.

Oregon Railway & Navigation Co.—At a meeting of the board of directors, held Nov. 21, a resolution was passed to increase the capital stock from 120,000 shares to 180,000, by issuing 60,000 additional shares, such shares to be offered for subscription at par to stockholders of record Dec. 28, 1881, in proportion to their respective holdings of stock, the subscription books to be opened at the offices of the company in New York and Portland, Or., on Dec. 29, 1881, and closed on Jan. 5, 1882, and all rights not availed of on the last-named day to be disposed of as the board shall direct.

The stock appertaining to the first two installments to be delivered Feb. 1 and to be entitled to all subsequent dividends. The stock appertaining to the next three installments to be delivered June 1 and to be entitled to all subsequent dividends. The stock appertaining to the last three installments to be delivered Sept. 1 and to be entitled to all subsequent dividends.

President Villard says in his circular that the reasons which have led the board of directors to propose an increase of the stock are that the actual construction expenditures during the current year exceeded the estimates, and that, owing to the closer relations between the company and the Northern Pacific, 100 miles of new line in addition to the mileage included in the original construction programme will have to be built; also, that more cars and locomotives are needed.

A meeting of stockholders is called at Portland, Or., Dec. 20, to take action on the resolution.

Grading on the line between Portland Or., and the Cascades has been suspended on account of heavy rains. The road-bed between the Cascades and the Dalles only waits the completion of the bridges to be ready for the rails.

This company has bought from Goodall, Perkins & Co. a controlling interest in the Pacific Coast Steamship Company, which owns a number of steamers running from San Francisco to points along the coast, and also owns the San Luis Obispo & Santa Maria Valley road.

Pennsylvania.—This company's statement for October shows for that month, as compared with the corresponding month last year, on all lines east of Pittsburgh and Erie:

A decrease in gross earnings of (5.4 per cent.)	$209,743
An increase in expenses of (5.6 per cent.)	123,619
Net decrease (19.7 per cent.)	$333,362

For the ten months ending Oct. 31, as compared with the same period in 1880, the same lines show:

An increase in gross earnings of (7.7 per cent.)	$2,414,885
An increase in expenses of (8.9 per cent.)	1,778,744
Net increase (4.5 per cent.)	$636,141

All lines west of Pittsburgh and Erie for the ten months of 1881 show a surplus over liabilities of $2,743,213, being a gain, as compared with the same period in 1880, of $228,478. This, with the increase in net earnings of the lines east of Pittsburgh and Erie, makes a total gain of $864,619.

Officers of this company had a conference with representatives of the Central Railroad, of New Jersey, at which several matters were settled. As a result of this conference it is understood that this company's Philadelphia & Long Branch line will not be extended from Bayhead along the shore to Long Branch, as was proposed, the Central having given fair terms for the use of its line by the trains of the Pennsylvania. This line will probably be used as the main line for trains between Philadelphia and Long Branch next season. Whether anything was said about the Pennsylvania's proposed branch from Metuchen to Long Branch is not known, but there seems to be an understanding that the line will not be built at present. The surveys have been made, but nothing further has been done.

As another result of the conference it is said that the Pennsylvania will make no opposition to the Central's bill providing for a bridge over the Morris Canal basin at Jersey City, to connect its station with the main portion of that city. This bill has been defeated several times, but will be presented to the New Jersey Legislature again this winter. It will still be opposed by the Lehigh Valley Company (lessee of the Morris Canal) and by some local interests, but with the Pennsylvania's support will be very likely to pass.

The Queen Anne & Kent road, a branch of the Delaware Division of the Philadelphia, Wilmington & Baltimore, has been added to the roads directly worked, and attached to the Delaware Division. Heretofore it has been controlled but not directly worked.

The company has agreed to aid in the building of the Elkton & Middletown road, which is a cross-cut from the Delaware Division to the main line of the Philadelphia, Wilmington & Baltimore road, provided the people on the line subscribe $25,000 to the stock.

It is said that the company is negotiating for the purchase of the Eastern Shore road, which extends the Delaware road from Delmar to Crisfield, Md., 38 miles. It is chiefly owned in Philadelphia.

The trains of the Philadelphia, Wilmington & Baltimore will begin to use the elevated road and the new passenger station at Broad and Filbert streets in Philadelphia on Sunday, Dec. 4. The main line trains will run in soon afterwards

Peoria & Farmington.—This road is now completed from Peoria, Ill., westward to Farmington, 25 miles, and regular trains have begun to run. It is a local road and accommodates a section of country lying between the Chicago, Burlington & Quincy and the Peoria & Iowa Division of the Wabash.

Pittsburgh & Rochester.—This company has been formed by the consolidation of the Rochester & Charlotte, the Rochester & Pittsburgh, the Buffalo, Rochester & Pittsburgh, the Great Valley & Bradford, the Bradford & State Line, and the Pittsburgh & New York: the whole will form a direct line from Lake Ontario to Pittsburgh, through the Bradford oil region and over the Low Grade Division of the Allegheny Valley and the Pittsburg & Western Railroad. The capital stock is to be $10,000,000. The finished part of the road is the Rochester & Pittsburgh road, from Rochester to Salamanca, 108 miles. The line from Rochester to Charlotte and portions of the line in Pennsylvania are now under contract, to be finished next summer.

Richmond & Allegheny.—A branch road is now being built from this road near Richmond northward about six miles to the property of the Henrico Coal Company, where several shafts are now opened.

Rocky Mountain.—This company has been organized at Helena, Montana, to build branches from the main line of the Northern Pacific to Benton, Butte, the Yellowstone Park and other points in the territory.

Rome, Watertown & Ogdensburg.—The following is the official statement of the plan of reorganization to which reference has heretofore been made, as set forth in a circular from the committee:

"In view of the long default in the payment of interest upon the consolidated mortgage bonds of this company, it is believed that a reorganization should be effected upon such a basis as will enable the company to free itself of its floating debt, to purchase equipment, and to so reduce its mortgage liabilities as to insure the prompt payment of its interest obligations.

"The present liabilities of the company are as follows:

Watertown & Rome, 7 per cent. 25 year bonds, due Sept. 1, 1880, but extended to 1910, at 6 per cent	$418,500
R., W. & Ogd., 1st mtg. 7 per cent. 30 year bonds, due Dec. 1, 1891	1,021,500
R., W. & Ogd., 2d mtg. 7 per cent. 20 yearbonds, due Jan. 1, 1892	1,000,000
Syracuse & Northern, 7 per cent. 30 year bonds, due July 1, 1901	500,000
Total prior liens	$2,940,000
Consolidated mtg. bonds, 7 per cent., due July 1, 1904, authorized $10,000,000, outstanding	5,500,000
Floating debt, Oct. 31, 1881	448,569
Unpaid coupons on consolidated mtg. bonds, due April 1, 1878, to Oct. 1, 1881, 28 per cent	1,540,000
Capital stock	5,293,900

"In order to bring the annual interest payments down to a point where there can be no reasonable doubt of the ability of the company to earn enough to meet them, and to provide for the floating debt, it is proposed:

"*First.*—To reduce the rate of interest upon the consolidated mortgage bonds to 5 per cent. per annum.

"*Second.*—To fund the accrued and unpaid interest on the consolidated mortgage bonds up to July 1, 1882, into non-cumulative income mortgage bonds, upon which such interest shall be paid as may be earned, not exceeding 7 per cent. per annum.

"*Third.*—To levy an assessment of $10 per share upon the capital stock; income mortgage bonds to be issued for the amount of assessments paid.

"To achieve the desired results, and to carry out the reorganization on the above basis, the sale of the road and its purchase by a committee, representing the bondholders and stockholders who assent to the proposed plan for providing for the debt of the company, may be necessary.

"Accordingly, and for this purpose, an agreement has been prepared of date of Nov. 9, 1881, setting forth more in detail the proposed changes, and all holders of consolidated bonds and of stock are requested to sign the same as soon as practicable.

"Copies of the agreement and any further information can be had on application to the Farmers' Loan & Trust Company, No. 26 Exchange Place, New York city, or to the secretary of the committee, Charles Parsons, Jr., No. 34½ Pine street, New York."

The Committee of Purchase and Reorganization consists of Samuel Sloan, Percy R. Pyne, Charles Parsons and George D. Morgan.

The directors of the company give the following indorsement to the plan of reorganization: "The undersigned board of directors of the Rome, Watertown & Ogdensburg Railroad Company, having unanimously approved and adopted the agreement referred to in this circular, and having authorized the officers of the said railroad company to fully co-operate with the Committee of Purchase and Reorganization therein named, and for that purpose to execute any and all instruments necessary to the success of the reorganization of the company upon the basis of the said agreement—do hereby advise all holders of the consolidated bonds and stock of the Rome, Watertown & Ogdensburg Railroad Company to sign the agreement and to deposit their securities in accordance with the terms thereof, at once."

St. Louis, Keokuk & Northwestern.—This road and its extension, the Keokuk & Northwestern, have been for some months controlled by the Chicago, Burlington & Quincy, and it is now announced that from Jan. 1 next, they will be incorporated with that company's lines. It is understood that a new division will be formed, including these roads, the branch from Burlington to Keokuk and probably the old Burlington & Southwestern road.

St. Louis & Southeastern.—Notice is given that there is a fund of $15,542.59 in charge of the United States Circuit Court for the Southern District of Illinois for the account of $17,000 first-mortgage bonds of this company, which have never been presented for payment. The fund is the remainder of the proceeds of the foreclosure sale. Said outstanding bonds must be presented to the Court by Feb. 1, 1882, or they will be barred from all share in said fund.

St. Paul, Minneapolis & Manitoba.—Track on the extension of the Grand Forks Branch westward is now laid to Larrimore, Dak., 30 miles westward from the late terminus at Ojata, and 68 miles from the junction with the main line to St. Vincent. Larrimore will be the terminus of this branch for the present.

The working force has been transferred to the line from Grand Forks northward up the Dakota side of the Red River, and track will be laid to Minto, 40 miles north of Grand Forks, this season, if possible.

Scotland Neck.—Track is now completed on this road from Halifax, N. C., on the Wilmington & Weldon road, southwest to Conoconara Swamp, nine miles. The rails will be down to Looking Glass, five miles further, by Dec. 15, and it is expected that the whole 19 miles from Halifax to Scotland Neck will be finished in January.

Securities on the New York Stock Exchange.—The following securities have been placed on the lists at the New York Stock Exchange:

Chicago, Burlington & Quincy, $3,000,000 Iowa Division 5 per cent. mortgage bonds; $9,000,000 Iowa Division 4 per cent. mortgage bonds, all running to 1919.

Chicago, Milwaukee & St. Paul, $1,230,000 Hastings & Dakota Division 7 per cent. bonds. These new bonds make the amount issued on that division $5,290,000 in all.

Missouri, Kansas & Texas, $1,000,000 additional general consolidated bonds, issued on 50 miles of new road completed south of Ft. Worth.

Ohio Central, $300,000 first-mortgage 6 per cent. bonds, and $300,000 income 7 per cent. bonds, issued on the new Mineral Division, from Corning to South Shawnee, 20 miles.

Oregon & California, $6,000,000 new first-mortgage bonds. This issue replaces all others.

Richmond & West Point Terminal Railway & Warehouse Co., $3,000,000 stock; no bonds issued. A majority of the stock is owned by the Richmond & Danville Company.

South Carolina.—In the United States Circuit Court last week several final orders were entered, completing the recent compromises and the transfer of the road. The so-called syndicate claim was settled by the payment of $135,472, the syndicate surrendering the second-mortgage bonds and the Greenville & Columbia and other securities which they held as collateral. The Court fixed the *pro rata* share of the second-mortgage bondholders in the proceeds of the foreclosure sale at 26 per cent., allowed the Receiver a commission of 1 per cent. for making the sale, and directed $25,000 to be retained in court as a fund to meet claims and bonds not yet presented for payment. Finally the transfer of the road was ordered to the purchasers, who have organized the South Carolina Railway Company and have executed the mortgages, etc., provided for in the agreement of reorganization.

South & North Alabama.—At the annual meeting in Montgomery, Ala., Nov. 26, only the Louisville & Nashville stock was represented and voted. On the same day a number of the individual stockholders met and made a formal protest against the action at the regular meeting.

A petition was filed in the United States Circuit Court at Montgomery on Nov. 23 asking for the appointment of a receiver for the road.

Southern Pacific and the Texas & Pacific.—The agreement, to which reference has heretofore been made, has been signed by C. P. Huntington and Jay Gould, representing the two companies. The contract, which is simply a traffic agreement, provides that the tracks of both the Gould and Huntington systems shall be joined about 80 miles east of El Paso, that branch, as well as others, to be jointly operated, the Texas & Pacific paying one-half the cost of construction and maintenance, and receiving one-half of the receipts. Through business is to be done on a *pro rata* basis to San Diego, Los Angeles and San Francisco. On the completion of the Huntington road through Texas, the seaboard or Gulf business is to be equally divided between both systems. In consideration of the privileges mentioned, as well as others of less import, the Texas & Pacific road relinquishes to the Southern Pacific its claims to land grants, right of way, and franchises west of El Paso. The first-named road agrees not to extend its tracks west of El Paso, and the Southern Pacific agrees not to parallel it east of that point. Any disputes are to be settled by arbitration.

Syracuse & Ontario.—This company has filed articles of incorporation to build a railroad from Syracuse, N. Y., northward to a junction with the New York, Ontario & Western. The road will be 23 miles long.

Tennessee & Sequatchie Valley.—The grading of this road is now completed from Spring City, Tenn., on the Cincinnati Southern, to the head of the Sequatchie Valley, about 14 miles, and tracklaying has been begun.

Texas & Pacific.—Track has been laid to the Cariso Pass, Tex., 20 miles eastward from the late terminus and 724 miles from Texarkana. At latest dates there remained 27 miles of track to be laid to the junction with the Southern Pacific, which will be at Mt. Banco, 80 miles east of El Paso. Under the new agreement no track will be laid east of the junction on this road, but the Southern Pacific track will be used. The junction will probably be made early this month.

Utica, Clinton & Binghamton.—It is said that the New York, Ontario & Western Company will take charge of this road Jan. 1 and operate it from that date, as successor to the New York & Oswego Midland. That company leased the road originally, the Delaware & Hudson Canal Company guaranteeing the lease. When the Midland collapsed, the guarantor assumed the obligation, and the road has since been worked by the Delaware, Lackawanna & Western as agent for the Delaware & Hudson. There has been yearly a deficit, and the guarantor is probably quite willing to give up the road.

Wabash, St. Louis & Pacific.—The Union Stock Yard Company, of St. Louis, has begun suit to recover $500,000 damages from this company for alleged breach of contract, in discriminating in favor of the National Stock Yard in East St. Louis, and against plaintiff's yards. The violations of contract charged extend over a period of five years, from 1876 until the present time.

Washington & Hope.—This company, which now owns a short line from Washington, Ark., to Hope, on the Iron Mountain road, has filed amended articles, providing for extensions from Washington northwest to the Indian territory line, about 70 miles, and from Hope southeast to the Louisiana line, about 30 miles.

Wellsville & Fillmore.—This company has been organized to build a narrow-gauge road from Wellsville, N. Y., on the New York, Lake Erie & Western road, north by west through Scio, Angelica and Belfast to Fillmore, about 30 miles.

York Springs.—It is proposed to revive this road, which was graded several years ago, and to complete it from York Springs, Pa., to a junction with the Harrisburg & Potomac near Dillsburg. An extension to East Berlin is also proposed.

ANNUAL REPORTS.

The following is an index to the reports of companies which have been reviewed in previous numbers of this volume of the *Railroad Gazette*:

	Page.
Alabama Great Southern	286
Allegheny Valley	601
Atchison, Topeka & Santa Fe	227
Atlanta & Charlotte Air Line	315
Atlanta & West Point	476
Atlantic, Miss. & Ohio	649
Baltimore & Hanover	408
Baltimore & Ohio	673
Baltimore & Potomac	315
Boston & Albany	615
Boston, Concord & Montreal	315
Boston, Hoosac Tun. & West	12
Boston & Lowell	27
Boston, Rev. Beach & Lynn	601
Bur., Cedar Rap. & No 105, 120,	674
Bur., & Northwestern	373
Cairo & St. Louis	228
Camden & Atlantic	490
Canada Southern	315
Canadian Railroads	239
Cape Fear & Yadkin Valley	228
Carolina Central	310
Central Iowa	164
Central, of New Jersey	228
Central Pacific	582
Charlotte, Col. & Augusta	228
Ches. & Ohio Canal	553
Chicago & Alton	133, 151
Chi., Burlington & Quincy	180
Chi. & Eastern Illinois	585
Chicago, Mil. & St. Paul	234
Chicago & Northwestern	454, 462
Chi., Rock Island & Pac	291, 367
Chi. & West Michigan	495
Cin., Hamilton & Dayton	330
Cin., Ind., St. Louis & Chi	642
Cin. & Muskingum Valley	549
Cin., Richmond & Ft. Wayne	394
Cincinnati Southern	59
Cin., Wabash & Michigan	291
Cleve., Col., Cin. & Ind	27, 206
Columbia & Greenville	476
Col. & Hocking Valley	354
Columbus & Toledo	353
Concord	290
Conn. & Passumpsic Rivers	599
Consolidation Coal Co	164
Cumberland Valley	546
Dayton & Union	44
Delaware	59
Del. & Hudson Leased Lines	44
Delaware & Hudson Canal	105, 568
Del., Lack. & Western	130
Delaware Western	76
Denver & Rio Grande	151, 320
Det. Grand Haven & Mil	490
Det., Lansing & Northern	552
Eastern R. R. Association	300
Eureka & Palisade	152
Evansville & Terre Haute	614
Fitchburg	12
Flint & Pere Marquette	291
Gal., Har. & San Antonio	195
Georgia R. R. & Banking Co	286
Grand Trunk	294, 553
Great Western, of Canada	235, 649
Green Bay & Minnesota	560
Gulf, Col. & Santa Fe	151
Hannibal & St. Joseph	163
Housatonic	331
Houston & Texas Central	315
Huntingdon & Broad Top Mt	560
Illinois Central	76, 120
Indiana, Bloom. & West	76
Indianapolis, Dec. & Spr	600
Indianapolis & St. Louis	475
Intercolonial	76
Jeff., Madison & Indianapolis	105
Junction & Breakwater	331
Kan. City, Ft. Scott & Gulf	546
Kentucky Central	76
Knox & Lincoln	164
Lake Erie & Western	614
Lake Shore & Mich So	250, 256
Lehigh Coal & Nav. Co	105
Lehigh Valley	44
Ligonier Valley	43
Little Rock & Fort Smith	234
Long Island	27
Louisville & Nashville	490, 553, 567
Louisville, New Albany & Chi	104
Maine Central	151
Manchester & Lawrence	310
Manhattan Elevated	495
Marietta & Cincinnati	133
Memphis & Charleston	649
Michigan Central	266, 272
Midland, of New Jersey	228
Mil., Lake Shore & Western	351
Minneapolis & St. Louis	642
Missouri, Kansas & Texas	354
Missouri Pacific	92
Mobile & Girard	394
Mobile & Ohio	447, 553
Montpelier & Wells River	315
Morris & Essex	599
Nashua & Lowell	290
Nashville, Chatta. & St. L	406, 552
Natchez, Jackson & Col	549
Nevada County	373
New Haven & Northampton	290
N. Y., N. H. & Hartford	11
N. Y., Pennsylvania & O	17, 181
N.Y. State R'roads	28, 44, 60, 106, 152
Norfolk & Western	394, 601
Northeastern (S. C.)	27
Northern Central	151
Northern (New Hampshire)	291
Northern Pacific	531
Ogdensburg & Lake Champlain	354
Ohio & Mississippi	132, 585
Old Colony	641
Oregon Ry. & Nav. Co	600
Pacific Mail Steamship Co	585
Paducah & Elizabethtown	468
Panama	307
Pennsylvania Company	417
Pennsylvania & New York	44
Pennsylvania Railroad	133
Pensacola & Perdido	234
Philadelphia & Reading	422
Phila., Wil. & Baltimore	11
Pitts. & Castle Shannon	120
Pitts., Cin. & St. Louis	271, 531
Pitts., Fort Wayne & Chi	291, 531
Pitts. & Lake Erie	28
Pitts., Titusville & Buffalo	27
Pitts., Wheeling & Kentucky	649
Portland & Ogdensburg	331
Portland & Rochester	394
Port Royal & Augusta	195
Prince Edward Island	92
Providence & Worcester	426, 615
Pullman's Palace Car Co	599
Pullman Southern Car Co	291
Richmond & Danville	60
Richmond, Fred. & Potomac	373
Rome, W'town, & Ogdensburg	44
Rutland	427
St. Johns. & Lake Champlain	476
St. Louis, Alt. & Terre Haute	584
St. Louis Bridge Co	368
St. Louis, Iron Mt. & So	120, 546
St. Louis & San Francisco	12, 531
St. Paul & Duluth	509
St. Paul, Minn. & Manitoba	495
Sandy River	170
Savannah, Florida & Western	401
South Carolina	195
Southern Pacific	331
Terre Haute & Indianapolis	448
Troy & Boston	12
Troy & Greenfield	427
Union Pacific	152, 164
Utah Southern	195
Utica & Black River	105
Vermont & Canada	567
Virginia & Truckee	545
Wabash, St. L. & Pac	27, 164, 317
Western Union Telegraph	709
West Jersey	475
Wilmington & Northern	286
Wisconsin Central	331
Worcester & Nashua	76

Boston & Providence.

This company owns a main line from Boston to Providence, 44 miles, all double track; the West Roxbury Branch, 5.37 miles; the Dedham Branch, 2.22 miles; the Stoughton Branch, 4.11 miles, and the India Point Branch, 8.05 miles, making 63.75 miles owned. It leases the Attleboro Branch, 4 miles, making 67.75 miles worked. The report is for the year ending Sept. 30, 1881.

The company controls the Providence, Warren & Bristol road, owning 1,851 shares of preferred (out of 2,873) and 1,430 shares of common stock (out of 1,500) of that company.

The general account is as follows:

Stock		$4,000,000.00
Funded debt		860,000.00
Accounts and balances		76,332.44
November dividend		160,000.00
Profit and loss		430,551.62
Total		$5,526,884.06
Road and equipment	$4,612,774.38	
Stoughton Branch	85,400.00	
Prov., Warren & Bristol stock	152,255.00	
Union Freight R. R. stock	79,014.42	
Real estate	198,000.00	
Materials	144,841.59	
Notes and accounts receivable	143,136.27	
Cash	111,462.40	
		5,526,884.06

The funded debt was reduced $20,000 during the year, all that was deemed prudent in view of large expenditures needed in Providence. Of the debt there is $800,000 bearing 7 per cent., $160,000 bearing 5 per cent. and $100,000 bearing 4 per cent. interest, making the total interest charge $54,000 per year. During the year $100,000 bearing 7 per cent. interest matured and was renewed at 4 per cent.

The traffic of the year was as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Train miles	865,216	852,282	I. 12,934	2.8
Passengers carried	3,802,405	3,574,104	I. 228,301	6.4
Passenger miles	42,191,736	42,990,453	D. 798,717	1.9
Tons freight moved	660,290	669,468	D. 9,178	1.4

The decrease was apparently in through business on passenger traffic.

The earnings for the year were as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Passenger	$822,751.57	$776,362.87	I. $46,388.70	6.0
Freight	533,956.52	486,724.85	I. 47,231.67	9.7
Mail and exp.	43,437.05	41,442.83	I. 1,994.22	4.7
Rents	19,167.82	19,395.08	D. 227.26	1.2
Total	$1,419,312.96	$1,323,925.63	I. $95,387.33	7.2
Expenses	1,023,910.12	901,746.09	I. 122,164.03	13.5
Net earnings	$395,402.84	$422,179.54	D. $26,776.70	6.3
Gross earn. per mile	20,949.27	19,541.34	I. 1,407.93	7.2
Net earn. per mile	5,836.20	6,231.43	D. 395.23	6.3
Per cent. of exps	70.72	68.11	I. 2.61	.....

The increase in gross earnings was more than balanced by that in expenses. Expenses include rent of Attleboro Branch, $11,605.81, and also taxes, which were $89,636.59, against $81,048.59 the preceding year, an increase of $8,588.

The result of the year was as follows:

Net earnings		$395,402.84
Balance of interest account	$28,712.17	
Dividends, 8 per cent	320,000.00	
		348,712.17
Balance to profit and loss		$46,690.67
Balance, Sept. 30, 1880	$391,311.29	
Less depreciation in real estate	7,450.34	
		383,860.95
Balance, Sept. 30, 1881		$430,551.62

Purchases of land at Boston, Attleboro and Pawtucket and a new paint shop at Roxbury were charged to expenses.

Dividends on Providence, Warren & Bristol and Union Freight stocks were credited to interest.

The taxes paid for the year were equal to nearly 2¼ per cent. on the stock.

Equipment was increased by 4 locomotives, 3 passenger and 24 box cars; three old engines were broken up.

The substitution of steel for iron rails has been continued

and only three miles of iron rails remain in the main track and 11 miles in the branches.

A new station at Dedham is nearly completed and the tracks there have been rearranged. An overhead bridge has been substituted for a dangerous grade highway crossing at Mt. Hope. A change now being made in the course of Stony Brook at Boylston Mill does away with two wooden bridges there; there will then be none but masonry or iron bridges on the main line.

Work has been begun on 2¾ miles of third track, which will complete a third track from Boston to Readville. The new track requires some heavy rock-cutting and masonry.

The report refers to the fact that in June last 50 years had passed since the corporation was chartered.

Naugatuck.

This company owns a line from Stratford, Conn., to Winsted, 57 miles, and its trains run over the New York, New Haven & Hartford track from Stratford to Bridgeport, 4 miles. The company also works under agreement the Watertown & Waterbury road, 4½ miles. Its report is for the year ending Sept. 30, 1881.

The general account, condensed, is as follows:

Stock ($35,088 per mile)		$2,000,000.00
Current accounts and September expenses		71,341.81
Profit and loss		319,060.85
Total		$2,390,402.66
Road and equipment ($37,501 per mile)	$2,137,570.32	
Stocks and bonds owned	12,600.00	
Real estate	30,000.00	
Materials	39,657.72	
Bills and accounts receivable	105,626.18	
Cash	64,948.44	
		2,390,402.66

The company has no funded debt and no floating debt. The cash and receivables are more than twice the amount of the current liabilities.

The earnings for the year were as follows:

	1879-80.	1878-79.	Inc. or Dec.	P. c.
Freight	$363,509.66	$344,575.70	I. $18,933.96	5.5
Passengers	226,944 96	203,004.79	I. 23,940.17	11.8
Mail, etc	23,956.31	24,809.10	D. 852.79	3.4
Total	$614,410.93	$572,389.59	I. $42,021.34	7.3
Expenses	413,019.97	354,137.66	I. 60,882.31	17.3
Net earnings	$201,390.96	$220,251.93	D. $18,860.97	8.6
Gross earn. per mile	9,990.42	9,307.15	I. 683.27	7.3
Net " " "	3,274.65	3,581.82	D. 307.17	8.6
Per cent. of exps	67.22	61.52	I. 5.70	....

Expenses include taxes, which were $21,324.01 last year, and $21,811.15 in the preceding year, being about 5 per cent. of the entire expense account.

The result of the year was as follows:

Net earnings, as above		$201,390.96
Dividends, 10 per cent		200,000.00
Surplus		$1,390.96
Balance, Sept 30, 1880		317,669.89
Balance to credit of profit and loss, Sept. 30, 1881		$319,060.85

Expenses were increased by the outlay necessary to provide for a large increase in business. The construction account has been closed for several years, and the cost of additional facilities provided for business is all included in expenses. The business and gross earnings show a considerable increase.

The train mileage for the year was as follows:

	1880-81.	1879-80.	Increase.	P. c.
Passenger	98,871	87,513	11,358	13.0
Freight	184,623	173,380	11,243	6.5
Service and switching	38,602	34,933	3,669	10.5
Total	322,096	295,826	26,270	8.9

Of the train service last year 9,020 miles were on the Watertown & Waterbury line.

The earnings were sufficient to pay the usual 10 per cent. dividends, without taking anything from the surplus. This accumulated surplus is now about 15 per cent. on the capital stock, an amount sufficient to secure regular dividends in the event of any contingency reducing the earnings temporarily. A permanent reduction is not expected.

Richmond, Fredericksburg & Potomac.

This company owns a line from Richmond, Va., to Quantico, 83 miles. The following statements are from the report for the year ending Sept. 30 last, presented at the annual meeting in Richmond last week.

The equipment consists of 14 locomotives; 15 passenger, 3 chair, 3 mail and 6 baggage and express cars; 51 box, 33 flat and 6 caboose cars; 12 material cars.

The earnings for the year were as follows:

	1880-81.	1879-80.	Increase.	P. c.
Passengers	$223,990.19	$203,585.46	$20,344.73	10.0
Freight, etc	182,997.38	126,776.34	56,221.04	44.3
Total	$406,927.57	$330,361.80	$76,565.77	23.2
Expenses	198,186.97	174,642.97	23,544.00	13.5
Net earnings	$208,740.60	$155,718.83	$53,021.77	34.1
Gross earn. per mile	4,902.74	3,980.26	922.48	23.2
Net " " "	2,514.95	1,876.13	638.82	34.1
Per cent. of exps	48.70	52.86	....	....

The increase in gross earnings was very large, and that in net earnings was still larger in proportion, expenses not having increased as much as the business.

About one-third of the track is now laid with steel rails.

During the year 2,574 passenger trains were run, carrying 142,616 passengers, an average of 55.4 passengers per train.

The result of the year was as follows:

Net earnings, as above		$208,740.60
Interest on bonds	$65,668.98	
Dividend on guaranteed stock	34,835.00	
Additions to property and extraordinary expenses	51,622.14	
		152,126.12
Balance on hand		$56,614.48

The report says: "It is a fact in the history of this company that for many years it has paid no dividends on the common stock, although its net profits each year have been considerable. These having been used in the purchase of real estate and in making other permanent additions of the property of the company have been placed to the credit of profit and loss, and now amount to the sum of $755,039.10, which sum ought to have been paid in dividends to the holders of the common stock if the board had thought it wise to increase the fixed charges of the company by borrowing money for the purpose of making these additions to its property.

"The board believe, in view of the improved condition of the road and of the country which supports it, that it will in the future be able to pay a fair dividend, say 2 per cent. semi-annually, upon its common stock and upon the amount heretofore retained from the stockholders and passed to the credit of profit and loss."

For these reasons, and to enable the stockholders to receive the equivalent of interest for the use of the money so withheld, without adding to the fixed charges of the company, the board recommend the passage by the stockholders of resolutions authorizing the issue of dividend obligations or certificates to the amount expended as stated above, such certificates to be entitled to the same dividends as may be paid on the common stock hereafter. The resolutions were passed as recommended.

Central Railroad & Banking Co., of Georgia.

The following statements are from an advance copy of President Wadley's report for the year ending Aug. 31, 1881, the 46th fiscal year of the corporation. The lines worked during the year were as follows:

	Miles.
Central Railroad:	
Savannah, Ga., to Macon	192.0
Gordon to Eatonton	39.0
Augusta Branch, Millen to Augusta	53 0
Total Savannah Division	284.0
Atlanta Division, Macon to Atlanta	102.5
Total Central R. R.	386.5
Southwestern Railroad:	
Macon, Ga., to Eufaula, Ala	143.0
Muscogee Branch, Fort Valley, Ga., to Columbus	71.0
Fort Gaines Branch, Cuthbert to Fort Gaines	20.0
Albany Branch, Smithville to Albany	23.5
Extension, Albany to Arlington	35.5
Perry Branch, Fort Valley to Perry	12.5
	305.5
Upson County R. R., Barnesville to Thomaston	16.5
Total worked	708.5

The road owned is the line from Savannah to Macon and the Atlanta Division, 294.5 miles. The Eatonton Branch, Augusta Branch (Augusta & Savannah road) and the Southwestern road are leased, the Upson County road worked under agreement. The company owns the chief interest in the Southwestern road, and its bonds are issued under a joint mortgage covering that road as well as its own.

The company also owns the Ocean Steamship Company, whose lines run between Savannah and New York; one-half interest in the Western Railroad of Alabama; controlling interests in the Mobile & Girard, the Vicksburg & Brunswick and other connecting lines. The Montgomery & Eufaula road is owned by the President of this company as purchaser at foreclosure sale, and is worked in the interest of this company.

Since the close of the year the Blakely Extension has been completed to Blakely, 14.5 miles beyond Arlington. The company now also holds one-half share in the lease of the Georgia Railroad.

The earnings and expenses were as follows:

Earnings:	1880-81.	1879-80.	Inc. or Dec.	P. c
Savannah Div.	$1,964,435.94	$1,681,142.55	I. $283,293.39	16.8
Atlanta Div.	741,923.46	603,580.20	I. 138,343.26	22.9
S. W. R. R.	945,529.28	844,866.13	I. 100,663.15	11.9
Upson Co. R. R.	14,496.12	14,513.87	D. 17.75	0.1
Total	$3,666,384.80	$3,144,102.75	I. $522,282.05	16.6
Expenses:				
Savannah Div.	1,168,272.00	850,029.50	I. 318,242.50	37.6
Atlanta Div.	475,158.12	303,060.46	I. 172,097.66	56.8
S. W. R. R.	643,189.11	469,478.48	I 173,710.63	37.0
Upson Co. R. R.	12,736.29	12,881.52	D. 145.23	1.1
Total exps.	$2,299,355.52	$1,635,449.96	I. $663,905.56	40.6
Net earnings:				
Savannah Div.	796,163.94	831,113.05	D. 34,949.11	4.2
Atlanta Div.	266,765.34	300,519.74	D. 33,754.40	11.2
S. W. R. R.	302,340.17	375,387.65	D. 73,047.48	19.5
Upson Co. R. R.	1,759.83	1,632.35	I. 127.48	7.9
Total net	$1,367,029.28	$1,508,652.79	D. $141,623.51	9.4
Cent. R. R. Bank	41,506.55	46,387.07	D. 4,880.52	10.6
Bank expenses	19,041.30	17,105.00	I. 1,936.30	11.3
Bank net	$22,465.25	$29,282.07	D. $6,816.82	23.5
Total net	$1,389,494.53	$1,537,934.86	D. $148,440.33	9.7

The large gain in earnings on all the lines was more than offset by the very considerable increase in expenses. This was due partly to much heavier renewals, and possibly to an increased local traffic at lower rates.

The average results, excluding bank earnings, were as follows:

	1880-81. Gross earn. per mile.	Net earn. per mile.	P. c. of exps.	1879-80. Gross. earn. per mile.	Net earn. per mile.	P c. of exps.
Savannah Div.	$6,917	$2,803	59.47	$5,920	$2,926	50.63
Atlanta Div.	7,238	2,603	64.05	5,880	2,932	50.21
S.W.R.R.	3,095	990	68.03	2,765	1,329	55.57
Upson Co. R. R.	878	107	87.84	880	99	88.75
All lines	$5,175	$1,929	62.71	$4,439	$2,129	52.02

The increase in the proportion of expenses to earnings is marked. The Savannah and Atlanta Divisions still show a large increase in net earnings per mile over those of two years ago.

The operations of the Ocean Steamship Company were as follows:

Gross earnings of ships	$466,442.70
Expenses of ships (46.66 per cent)	217,612.59
Net earnings of ships	$248,830.11
Net receipts from Vale Royal property (wharves, etc.)	39,941.75
Net receipts from Gordon cotton press	12,349.71
Total net income	$301,121.57

President Wadley's report says: "The season just past has been unpropitious throughout most of the territory tributary to the line of our road, and labor is now being diverted from cultivating the soil to the construction of competing lines for transportation—thus reducing the product of the soil, and constructing lines of transportation in competition with those that are now more than capable of doing all the business that is offered. While this is presented as a truthful statement of appearances at the present time, it is not to be regarded as depreciating the value of your stock, but as a caution against too sanguine expectation for the future of the company, which is dependent upon many contingencies for its prosperity. * * * * We have been obliged to add largely to our rolling stock, amounting to about $150,000 over and above that supplied for the previous year. We have also expended $205,000 for rails, mostly steel, in excess of corresponding expenditures for the previous year or for some years past. * * *

"The Western Railroad of Alabama—in which we are jointly interested with the Georgia Railroad Company—has been reasonably prosperous, and we have received from it $161,000. Bonds of that company amounting to $300,000 fell due July last. Of these, $269,000 have been paid by this company and are held for future adjustment with the Georgia Railroad Company. There are yet outstanding $1,803,000 bonds of the Western Railroad, of Alabama. Of these $360,000 are due in 1888 and $1,167,000 in 1890. The board have had under consideration the organization of the Western Railroad, of Alabama, as a company, and then for it to issue bonds to reimburse our company for the payments that have been made on account of it. This will require the co-operation of the Georgia Railroad Company, which it is not doubted will be readily obtained. * * *

"In view of the fact that dividends have been withheld from the stockholders and the money expended in constructing and improving the property of the company, the board of directors during the past year concluded that it would be just to make a distribution of debentures, or certificates of indebtedness, among the stockholders, to compensate somewhat for the interest which they were fairly entitled to upon the original investment. Acting upon this view it was determined to issue debentures to the extent of 40 per cent. on the capital stock of this company, and under the terms of the lease of the Southwestern Railroad, its stock was entitled to 32 per cent. To persons not familiar with the past history of this company it may appear that this operated as a virtual watering of the stock, whereas in point of fact it has not been equal to the amount due the stock, allowing only 7 per cent. per annum simple interest. This is demonstrated from records of the company and is illustrated by an original subscription to the stock made by the late George B. Cumming This stock has been credited with every dividend from the inception of the company, and is equal to dividends of only about 5.6 per cent. per annum on the investment, and lacking 60 per cent. on the stock of paying 7 per cent. per annum, simple interest, on the amount subscribed."

European & North America.

This company owns a line from Bangor, Me., to Vanceboro, 114 miles. It is successor through foreclosure to an earlier company of the same name, and its first annual report is for the year ending Sept. 30, 1881.

The equipment consists of 15 locomotives; 15 passenger, 4 old passenger, 7 baggage, 2 postal and 2 saloon cars; 292 box, 4 refrigerator, 21 stock, 208 eight-wheel flat and 53 four-wheel flat cars; 3 service cars, 3 flangers and 3 snowplows. Of the box cars reported 110 are leased.

The general account is as follows:

Stock		$2,156,000.00
Land-grant bonds and interest, convertible into stock		343,140.00
Bonds		1,019,000.00
Accounts and balances		99,140.00
Profit and loss		20,781.86
Total		$3,638,061.86
Road and equipment	$3,455,904.17	
Materials and fuel	42,027.07	
Accounts and balances receivable	53,750.57	
Cash	86,380.05	
		3,638,061.86

The bonds outstanding were not included in the foreclosure; they are $19,000 first-mortgage bonds and $1,000,000 city of Bangor loan. They bear 6 per cent. interest.

The new stock represents the former land-grant bonds which were included in the foreclosure. The total amount of these bonds was $2,000,000, and the accrued interest $660,000. There were $155,610 bonds and interest retired by the sinking fund, leaving $2,540,390 convertible into stock. Of this amount the sum of $2,156,000 has been exchanged for stock, leaving $343,140 still to be converted.

The company has a considerable land grant, most of it in scattered parcels remote from the road and valuable chiefly for its timber. The total receipts from land have been $102,870.68, of which $55,466.66 was used in buying bonds, the rest chiefly for expenses. Receipts for stumpage last year were $2,459.25, about enough to pay the taxes on the lands.

The earnings of the year were as follows:

	1880-81.	1879-80.	Inc. or Dec.	P.c.
Passengers	$151,958.35	$131,595.76	I. $20,362.59	10.9
Freight	285,146.91	248,341.64	I. 36,805.27	14.8
Mail, etc	34,287.58	23,531.71	I. 10,755.87	45.8
Rents, etc	6,544.27	4,856.95	I. 1,687.32	34.4
Total	$477,937.11	$408,326.06	I. $69,611.05	17.1
Expenses	398,168.31	280,286 01	I. 117,882.30	42.1
Net earnings	$79,768.80	$128,040.05	D. $48,271.25	37.7
Gross earn. per mile	4,192.43	3,581.81	I. 610.62	17.1
Net earn. per mile	699.73	1,123.16	D. 423.43	37.7
Per cent. of exps	83.31	68.64	I. 14.67	....

The increase in gross earnings was very considerable. The increase in expenses was partly from increased train service, but chiefly from the heavy renewals and improvements of road.

The Treasurer's account was as follows:

Net earnings		$79,768.80
Interest on bonds		61,140.00
Net balance		$18,628.80
Received from Land Agent		28,045.70
" " Trustees		105,296.30
Total		$151,970.80
Paid for equipment	$45,698.94	
" on Stetson purchase	5,000 00	
" coupons in excess of stock issued	2,200.00	
		52,898.94
Balance		$99,071.86

The amount paid for equipment was for additions to the rolling stock, all repairs and rebuilding being included in expenses.

The passenger business of the year was as follows:

	1880-81.	1879-80.	Increase.	P.c.
Passengers carried	173,875	154,502	19,373	12.5
Passenger miles	5,859,728	5,332,237	527,491	9.9
Av. receipt per pass. mile	2.59 cts.	2.47 cts.	0.12 ct.	4.9

The largest increase was in local business; 67.3 per cent. of the passenger miles last year was made by through passengers.

The Superintendent's report shows that 2,248 tons steel rails, 1,029 tons re-rolled iron rails and 32,083 new ties were used in renewals. There were 8,442 ft. new sidings built, 6¾ miles new fence put up and 80,000 yards gravel ballast used. Several new bridges were built and others repaired. Several stations were rebuilt and semaphore signals put up at points where needed. The road-bed was very much improved. There were 4 passenger, 1 postal, 26 box, 50 flat and 15 repair cars added to equipment.

The President reports that the rails on 47 miles of the road will soon need renewal. There is also need of more freight cars and of new repair shops, the present shops at Mattawamkeag being temporary structures and insufficient for the needs of the road.

The passenger business has improved very much, largely from a better understanding with the Intercolonial road, and the running of an additional train making good through connections. The alliance with the Maine Central and the St. John & Maine roads was of much benefit.

The road passed through the very severe winter with less trouble than might have been expected. Trains have been run with freedom from all serious accidents.